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Power Generation Group Intermountain Power Project

August 11, 1982

Babcock & Wilcox
a McDermott company
2100 East Katella Avenue, Suite 210
Anaheim, California 92806
(714) 978-3272

Mr. J. H. Anthony
Project Director
Intermountain Power Project
Department of Water & Power
City of Los Angeles
P.O. Box 111, Room 931
Los Angeles, California 90051

Attn: Mr. A. P. Erickson
Manager Procurement

Re: Specification 2010
Boiler Units 1, 2, 3, & 4
Intermountain Power Project
B&W Ref: RB-614/617, 334-0614/617
Sub: Contract Execution

Gentlemen:

Thank you for the Contract identified as File 62.3401 with an effective date of May 29, 1981. We have reviewed the Contract and it has been executed in four (4) duplicate originals by Mr. T. L. Bower conditional on your acceptance of the following clarifications and corrections. The required bonds will be forwarded at a later date.

The following are the items which need correction or clarification:

1. On Page C-1 of the Execution Document reference (2) relative to the Contractor's Proposal P23-310 is amended to include the following: "with pages revised and/or added for contract through February 11, 1982"
2. Page C-8, Article 3.3.1, Option for Furnishing Pneumatic Control Drives. The words "or Forboro Company" on the fourth line is deleted.
3. Page C-25a is attached hereto and becomes part of the conformed contract.
4. Page C-31 fourth line from the bottom, "Sealing air, from temperature air duct" should read "Sealing air, from tempering air duct".
5. Page C-31, 32 and 33. It should be understood that unless specifically identified to the contrary, all data on these pages is calculated at maximum capacity.
6. Page E1-2, Article 1.11, line 70½. The word "specificaitons" should read "specifications".

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

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J. H. Anthony

7. Page E1-16, Article 19.1.3, line 594. The statement "within the State of Utah" is amended to read, "within the State of Utah, and if not possible, in the State of California".
8. Page E1-19, Article 19.2.2, line 704. The following statement is added after the sentence ending "PTDIS is delivered.": The PTDIS for Unit 1 will be delivered no later than 60 days prior to the "Erected complete in accordance with the contract and ready for operating tests not later than" date as stated in Div. F1, Article 2.1, page F1-1.
9. Page F1-16, Article 13, line 655. The sentence which reads "All equipment delivered by rail shall be on flat cars" is deleted.
10. Page F2-2, Article 2.2.1, line ^{91 1/2}194. The phrase "on a mutually acceptable basis" shall be inserted after the word "provide" such that this paragraph would read: "The Contractor shall actively participate in a mutually agreed upon schedule development and implementation program and shall provide on a mutually acceptable basis the information in a format similar to and at the frequencies specified herein".
11. Page F2-8, Article 14, line 313. Reference "Page 19" should read "Page F1-19".
12. Page G2-4, Article 2, line 150. Item (o) which reads "air heater ash hopper outlet" is deleted.
13. Page G3-43, Article 21.1, line ¹³⁴⁵1435. The sentence beginning "Each fan" and ending "rotor diameter" is deleted.
14. Page G3-26, Article 16, line 704. The sentence which reads "Where the total insulation thickness is greater than 2 inches, the enclosure shall be insulated with 2 layers" is deleted.

Very truly yours,

BABCOCK & WILCOX

J. S. Laing
J. S. LAING
District Manager
Los Angeles

JSL:yv

Enclosures: Contract (4)
Page C-25a

EXECUTION DOCUMENT

The Intermountain Power Agency, a political subdivision of the State of Utah organized and existing under the Interlocal Co-operation Act, Title 11, Chapter 13, Utah Code Annotated 1953, as amended, hereinafter called the "IPA", and Babcock & Wilcox, hereinafter called the "Contractor," hereby agree:

The Contractor, in consideration of the payment agreed to be made hereunder to said Contractor by the IPA, agrees to furnish and deliver to the IPA, and the IPA agrees to receive delivery of and to pay for, the items hereinafter set forth, all in accordance with

(1) IPP Specifications 2010N, Revised May 29, 1981

(2) Contractor's Proposal P23-310, Revised May 29, 1981 with ~~PAGES REVISED AND/OR ADDED FOR CONTRACT THRU FEBRUARY 11, 1982~~ *
a copy of each of which is attached hereto and made a part hereof.

1. Precedence of Documents and Effective Date of Contract:

1.1 Precedence of Documents: The Contract Documents (sometimes hereinafter referred to as the contract) includes the following and, in the event of conflict among these documents, the order of listing shall be the order of precedence among these documents:

- (1) This Execution Document
- (2) IPP Specifications 2010N
- (3) Contractor's Proposal

1.2 Effective Date of Contract: The effective date of contract shall be May 29, 1981.

2. Contract Price, Options, and Data: The Contract Price, Options, and Data for each of the 4 Boiler Units shall be as follows:

*off site,
Utah* → Contractor hereby agrees to furnish and deliver to the Intermountain Power Project Manager, f.o.b. cars, plant site railhead, 11 miles west of Lynndyl, Utah, in accordance with Specifications 2010N, the following:

Four Boiler Units designed for Maximum Continuous Rating (MCR) as defined in Article 2 of Division G3, complete with special tools and engineering services, as follows:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

* CONTRACT EXECUTION C-1
LETTER of Aug. 11, 1982

	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
UNADJUSTED BASE PRICE	\$48,450,000	\$47,400,000	\$47,650,000	\$47,900,000
Adjustments required to furnish Boiler Units in accordance with Specifications 2010N:				
321H stainless steel tubing	265,000	266,350	267,700	269,000
Anchor/Darling acid cleaning connectors	12,500	12,500	12,500	12,500
Water level gages with 29-inch visibility	15,000	15,000	15,000	15,000
Primary air heater inlet dampers	70,000	70,500	71,000	71,500
Para flow dampers in primary air duct with external bearings	11,000	11,000	11,000	11,000
Short toggle section for air heaters	80,000	80,000	80,000	80,000
Noise Control Package	95,000	95,500	96,000	96,500
Without top grid steel	<u>(1,200,000)</u>	<u>(1,100,000)</u>	<u>(1,105,500)</u>	<u>(1,111,000)</u>
ADJUSTED BASE PRICE	\$47,798,500	\$46,850,850	\$47,097,700	\$47,344,500
100 percent payment plan with irrevocable letter of credit for 10 percent of Contract Price Pursuant to Article 19 of Division E1 of the Specifications	(700,000)	(700,000)	(700,000)	(700,000)
Delete feeder discharge valves Pursuant to Subarticle 20.7.5 of Division G3 of the Specifications	(75,000)	(75,000)	(75,000)	(75,000)
Swing valves at burners Pursuant to Subarticle 20.7.5 of Division G3 of the Specifications	135,000	135,000	135,000	135,000

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	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
Ceramic lining for burner piping Pursuant to Subarticle 20.7.5 of Division G3 of the Specifications	1,526,000	1,535,000	1,544,000	1,551,000
Stainless steel heavy wall tubing in lead tubes Pursuant to Article 8 of Division G3 of the Specifications	150,000	150,000	150,000	150,000
Additional access and observation doors Pursuant to Article 13 of Division G3 of the Specifications	38,000	38,000	38,000	38,000
Contractor's standard cleaning and painting for buckstays and miscellaneous top steel Pursuant to Cleaning and Preservation Procedures in Section 1 of the Contractor's Proposal	(90,000)	(90,000)	(90,000)	(90,000)
Dual valving for desuperheaters Pursuant to Subarticle 22.3 of Division G3 of the Specifications	125,000	125,000	126,000	126,500
Second nuclear monitor pursuant to Subarticle 20.7.1 of Division G3 of the Specifications	7,000	7,000	7,000	7,000
ADJUSTED CONTRACT TOTAL	\$48,914,500	\$47,975,850	\$48,232,700	\$48,487,000

	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
Changes incorporated under Change Order No. 1 and authorized by IPP Board Action on October 16, 1981				
Ljungstrom 33 1/2-V1-64 secondary and 24 1/2-V1-44 primary air heaters	50,000	50,000	50,000	50,000
Westinghouse Model No. 23120-D primary air fans with 2-speed motor	335,000	335,000	335,000	335,000
ADJUSTED CONTRACT TOTAL WITH CHANGE ORDER NO. 1	\$49,299,500	\$48,360,850	\$48,617,700	\$48,872,000

3. Options Relating to Furnishing and Delivering the Boiler Units:

3.1 Options for Changes in the Performance Guarantees of the Boiler Units: The Project Manager shall have the right to exercise any or all of the options for changes in the Performance Guarantees of the Boiler Units at any time within 30 calendar days after the effective date of contract.

3.1.1 Options to Change Main Steam Flow: The Project Manager shall have the option to require a change in main steam flow by changing Maximum Continuous Rating. If the option is exercised, the price change per Boiler Unit, per increments of 50,000 pounds per hour, up or down a maximum of 150,000 pounds per hour, adding for a greater flow, subtracting for a lesser flow, shall be:

<u>Unit No.</u>	<u>Price Change Per 50,000 Lb/hr</u>
1	\$375,000.00
2	360,000.00
3	362,100.00
4	365,100.00

3.1.2 Option to Change Temperature of the Feedwater at the Economizer Inlet: The Project Manager shall have the option to require a change in temperature of the feedwater at the economizer inlet at Maximum Continuous Rating to any temperature within the range of plus or minus 3F, from the specified temperature. If the option is exercised, the price

change, per Boiler Unit, per degree F, adding for a lesser temperature, subtracting for a greater temperature, shall be:

<u>Unit No.</u>	<u>Price Change Per Degree F</u>
1	\$ 0.0
2	0.0
3	0.0
4	0.0

3.1.3 Option to Increase Boiler Unit Auxiliary Steam Production Capability: The Project Manager shall have the option to require an increase in Boiler Unit auxiliary steam production capability. If the option is exercised, the price change per Boiler Unit, per increments of 25,000 pounds per hour, a maximum of 100,000 pounds per hour, for a price increase, shall be:

<u>Unit No.</u>	<u>Price Change Per 25,000 Lb/hr</u>
1	\$128,000.00
2	128,750.00
3	129,500.00
4	130,250.00

3.1.4 Option to Change Reheater Absorption: The Project Manager shall have the option to require a change in reheater heat absorption at Maximum Continuous Rating by changing reheat steam inlet conditions, or reheat steam flow, separately, or in any combination. If the option is exercised, the price change per Boiler Unit, per increments of 25 million Btu's per hour, up or down a maximum of 75 million Btu's per hour, adding for a greater heat absorption, subtracting for a lesser heat absorption, shall be:

<u>Unit No.</u>	<u>Price Change Per 25 Million Btu/hr</u>
1	\$163,900.00
2	164,800.00
3	165,700.00
4	166,600.00

3.2 Options to Furnish Additional Equipment for the Boiler Units: The Project Manager shall have the right to exercise any or all of the options to furnish additional equipment for the Boiler Units on or within the times specified below.

3.2.1 Option to Furnish a Burner Management Control System: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with a Bailey Controls Company or a Forney Burner Management Control System with the accessories required to furnish such systems in accordance with Division G5 of the Specifications. The Project Manager shall have the right to exercise this option on or prior to January 1, 1983. The increases in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>	
	<u>Bailey System</u>	<u>Forney System</u>
1	\$583,850.00	\$720,000.00
2	559,100.00	570,000.00
3	562,300.00	577,900.00
4	565,200.00	586,900.00

3.2.1.1 Accessories for Forney System: Supervisory Step-by-Step Function for the Forney Automatic Burner Management Control System.

AA-001

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$15,300.00
2	8,600.00
3	8,600.00
4	8,600.00

3.2.1.2 Accessories for Bailey and Forney Systems: Eight additional flame scanner packages per Boiler Unit for the Bailey or the Forney Burner Management Control System.


AA-001

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$13,500.00
2	13,000.00
3	13,100.00
4	13,200.00

3.2.2 Option to Furnish a Full By-Pass System: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with a Full By-Pass System as referred to in Subarticle 20.6.6 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option within 120 calendar days after the effective date of contract. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$1,365,900.00
2	1,339,000.00
3	1,346,700.00
4	1,353,700.00

3.2.3 Option to Furnish Partial By-Pass System: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with a Partial By-Pass System as referred to in Subarticle 20.6.7 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option within 120 calendar days after the effective date of contract. The increase in price, if such option is exercised, shall be:



<u>Unit No.</u>	<u>Increase in Price</u>
1	\$665,000.00
2	645,000.00
3	648,000.00
4	651,000.00

3.2.4 Option to Furnish a PC Start-Up System: The Project Manager shall have the option to require the Contractor to furnish and delivery each Boiler Unit with a PC Start-Up System as referred to in Subarticle 20.6.4.2 of Division G3 of

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the Specifications. The Project Manager shall have the right to exercise this option within 60 calendar days after the effective date of contract. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$681,500.00
2	618,000.00
3	621,500.00
4	624,800.00

3.2.5 Option to Furnish Plasma Torch Direct Ignition System: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with a Plasma Torch Direct Ignition System as referred to in Subarticle 20.6.3.2 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option, for Boiler Unit 1, within 365 calendar days after the effective date of the contract and, for Boiler Units 2 through 4, within 365 calendar days after initial turbine synchronization of Unit 1. The increase in price, if such option is exercised, shall be:

AA-001 →

<u>Unit No.</u>	<u>Increase in Price</u>
1 <u>Only</u>	\$1,000,000.00
2	1,000,000.00
3	1,000,000.00
4	1,000,000.00

3.3 Options for Changes in Equipment Requirements for the Boiler Units: The Project Manager shall have the right to exercise any or all of the options for changes in equipment requirements for the Boiler Units on or within the times specified below.

3.3.1 Option for Furnishing Pneumatic Control Drives Other Than Specified: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with Westinghouse Electric Corporation ~~or Foxboro Company~~ pneumatic control drives in lieu of the Bailey Controls Company pneumatic control drives specified in Subarticle 22.2 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option at any time prior to January 1, 1983. The decrease in price, if such option is exercised, shall be:

DELETED PER
THE EXEMPTION
DOC. EXCEPTION'S
LETTER OF
AUG 11, 1982

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<u>Unit No.</u>	<u>Decrease in Price</u>
1	\$65,150.00
2	65,500.00
3	65,800.00
4	66,200.00

3.3.2 Option for Furnishing Electric Control Drives:

The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit with Westinghouse Electric Corporation, Bailey Controls Company, Leeds and Northrup Company, or Foxboro Company electrically-operated control drives in lieu of pneumatically-operated control drives specified in Subarticle 22.2 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option at any time prior to January 1, 1983. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>			
	<u>Westinghouse</u>	<u>Bailey</u>	<u>Leeds & Northrup</u>	<u>Foxboro</u>
1	\$300,000.00	\$262,000.00	\$135,000.00	\$125,000.00
2	301,500.00	262,000.00	135,000.00	125,000.00
3	303,000.00	262,000.00	135,000.00	125,000.00
4	304,000.00	262,000.00	135,000.00	125,000.00

3.3.3 Option to Furnish Boiler Units without

Miscellaneous Small Collecting Steel Supports: The Project Manager shall have the option to require the Contractor to furnish and deliver each Boiler Unit without miscellaneous small collecting steel supports as referred to in Subarticle 25.2 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option within 84 calendar days after the effective date of the contract. The decrease in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Decrease in Price</u>
1	\$150,000.00
2	145,000.00
3	145,700.00
4	146,500.00

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3.3.4 Option to Furnish the Contractor's Standard Cleaning and Painting for Buckstays Only: The Project Manager shall have the option to require the Contractor to furnish his standard cleaning and painting, as referred to in Cleaning and Preservation Procedures of Section 1 of the Contractor's Proposal, for buckstays only. The Project Manager shall have the right to exercise this option within 84 calendar days after the effective date of the contract. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$40,000.00
2	40,000.00
3	40,000.00
4	40,000.00

3.3.5 DELETED:

3.3.6 Option to Furnish Primary Air Fans With Variable-Speed Motors: The Project Manager shall have the option to require the Contractor to furnish and deliver the primary air fans for each Boiler Unit, as referred to in Subarticle 21.9 of Division G3 of the Specifications, with variable-speed motors. The Project Manager shall have the right to exercise this option within 60 calendar days after the effective date of the contract. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$600,000.00
2	600,000.00
3	600,000.00
4	600,000.00

3.4 Option to Furnish and Deliver Spare Parts, F.C.E. Plant Site: Each spare part shall be interchangeable with, and shall be of the same material and workmanship as, the corresponding part included with the equipment furnished under the Specifications. The Project Manager shall have the right and option to purchase spare parts either in accordance with Subarticle 3.4.1 of this Document or Subarticle 3.4.2 of this Document, or both Subarticles. The Project Manager reserves the right to specify, in any order placed, the quantity of spare parts and the subarticle number under which such spare parts are being ordered; provided, however, that no order will specify

that a combination of spare parts be furnished in accordance with both Subarticles 3.4.1 and 3.4.2 of this Document.

The Contractor shall provide a representative from his Customer Parts and Services organization to meet all major consolidated shipments and to assist the Project Manager that they are properly received and placed into stock.

3.4.1 Spare Parts Listed in Table A: The Project Manager shall have the right to order spare parts listed in Table A, attached hereto, at the prices quoted in said table, at any time prior to delivery of the steam drum for Unit 1. Prices will be subject to adjustment in accordance with Subarticle 20.2 of Division E1 of the Specifications.

3.4.2 Spare Parts From List Furnished by Contractor: Upon completion of engineering design for each major piece of equipment to be furnished hereunder, the Contractor shall furnish a complete and definitive list of spare parts for such equipment. The Project Manager shall have the right to order any of the spare parts listed, at the prices quoted in said list, within 60 calendar days after receipt of the spare parts list.

The prices quoted shall be in accordance with the then current replacement parts price of the manufacturer and shall not exceed the price offered to any other customer at that time. The Contractor shall certify to such fact on submission of each spare parts list. Prices shall not be subject to adjustment.

3.5 Option to Furnish and Deliver a Pulverizer Replacement Parts Package (PRPP) for the Boiler Units F.O.B. Plant Site: The Project Manager shall have the option to require the Contractor to furnish and deliver a Pulverizer Replacements Parts Package (PRPP) for the Boiler Units, as referred to in Subarticle 20.7.4 of Division G3 of the Specifications. The Project Manager shall have the right to exercise this option at any time within 270 calendar days after the effective date of the contract. The lump sum price, if the option is exercised, shall be:

<u>Unit No.</u>	<u>Lump Sum Price</u>
1 through 4	\$3,500,000.00

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3.6 Option for Additional Radiographic Examination (ARE) for the Boiler Units: The Engineer shall have the option to require the Contractor to make additional radiographic examinations of shop pressure welds for the Boiler Units, as referred to in Subarticle 3(e) of Division G1 of the Specifications. The Engineer shall have the right to exercise this option from time to time during the contractual period. The price per hour shall be:

Price
Per Hour

Additional Radiographic Examinations.....\$40

4. Taxes Relating to Furnishing and Delivering Boiler Units: The foregoing prices relating to furnishing and delivering Boiler Units are exclusive of all applicable taxes as defined in Article 38 of Division F1 of the Specifications.

5. Options Relating to Erection of the Boiler Units: The Project Manager shall have the right to exercise any or all of the options relating to erection of the Boiler Units on or prior to November 25, 1981.

5.1 Option to Erect the Material and Equipment for Each Boiler Unit: The Project Manager shall have the option to require the Contractor to erect 4 Boiler Units complete and ready for operation at the Intermountain Power Project plant site located 11 miles west of Lynndyl, Utah, in accordance with Division G6 of the Specifications. The erection price, if such option is exercised, shall be:

↙ OPTION EXERCISED BY AA-001

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	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
UNADJUSTED ERECTION PRICE	\$23,397,000	\$21,852,000	\$21,418,000	\$20,993,000

Adjustments required
to erect Pciler Units
in accordance with
Specifications 2010N:

Water level gages with 28-inch visibility	4,050	3,800	3,700	3,600
Primary air heater inlet dampers	22,300	20,850	20,500	20,000
Short toggle section for air heaters	115,200	115,200	115,200	115,200
Noise Control Package	196,000	185,000	183,700	183,700
Without top grid steel	(6,500)	(6,100)	(6,100)	(5,900)
Ten percent field weld radiography	154,650	142,350	139,700	137,050
ADJUSTED ERECTION PRICE	\$23,982,700	\$22,313,100	\$21,874,700	\$21,436,650
Delete feeder discharge valves	(3,800)	(3,800)	(3,800)	(3,800)
Swing valves at burners	28,500	28,500	28,500	28,500
Ceramic lining for burner piping	42,700	40,000	39,000	38,500
Additional access and observation doors	30,800	28,400	27,800	27,300
Dual valving for desuperheaters	56,300	52,500	51,500	50,500
ADJUSTED ERECTION TOTAL	\$24,037,200	\$22,458,700	\$22,017,700	\$21,577,650

CO* 9 Lump sum \$162,270.00
CONTRACTOR PROVIDED
CHANGE FACILITY

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	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
Change incorporated under Change Order No. 1 and authorized by IPA Board Action on October 16, 1981				
Ljungstrom 33 1/2- V1-64 secondary and 24 1/2-V1-44 primary air heaters	103,200	103,200	103,200	103,200
Westinghouse Model No. 23120-D primary air fans with 2-speed motor	45,200	45,200	45,200	45,200
TOTAL ERECTION PRICE WITH CHANGE ORDER NO. 1	\$24,185,600	\$22,607,100	\$22,166,100	\$21,726,050

ADD ERECTION OF
 HOLD OUT STEEL \$600,000.00 \$600,000.00
 SEE C.O. 10
 REV. 1

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

5.2 Options for Erection Work Relating to Changes in Performance Guarantees of the Boiler Units: The Project Manager shall have the right to exercise either or both of the options for erection work relating to changes in Performance Guarantees of the Boiler Units.

5.2.1 Option for Erection Work to Increase Boiler Unit Auxiliary Steam Production Capability: The Project Manager shall have the option to require the Contractor to do erection work to increase each Boiler Unit auxiliary steam production capability as referred to in Subarticle 3.1.3 of this Document. The increase in erection price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$44,100.00
2	40,800.00
3	41,100.00
4	41,400.00

5.2.2 Option for Erection Work to Change Reheater Absorption: The Project Manager shall have the option to require the Contractor to do erection work to change reheater absorption for each Boiler Unit as referred to in Subarticle 3.1.4 of this Document. The increase in price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Price Change per 25 Million Btu/hr</u>
1	\$69,000.00
2	62,300.00
3	62,700.00
4	63,100.00

5.3 Options to Erect Additional Equipment for the Boiler Units: The Project Manager shall have the right to exercise any or all of the options to erect additional equipment for the Boiler Units.

5.3.1 Option to Erect a Purser Management Control System: The Project Manager shall have the option to require the Contractor to erect each Boiler Unit with a Faily Controls or a Forney Burner Management Control System, referred to in Subarticle 3.2.1 of this Document, and 8 additional Flame Scanner Packages for each Boiler Unit. The increase in the erection price, if such option is exercised, shall be:

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AA-001

<u>Unit No.</u>	<u>Increase in Price</u>	
	<u>Bailey System</u>	<u>Forney System</u>
1	\$24,300.00	\$44,500.00
2	22,650.00	41,500.00
3	22,700.00	41,600.00
4	22,800.00	41,700.00

<u>Unit No.</u>	<u>Increase in Price</u> <u>(Flame Scanner Packages)</u>
1	\$2,500.00
2	2,400.00
3	2,500.00
4	2,600.00

SEE AA-00
FOR REVISE
PRICE INC.
INCLUDED ARE
ERECTION COST

5.3.2 Option to Erect a Full By-Pass System: The Project Manager shall have the option to require the Contractor to erect each Boiler Unit with a Full By-Pass System as referred to in Subarticle 3.2.2 of this Document. The increase in erection price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$182,200.00
2	170,400.00
3	171,600.00
4	172,900.00

5.3.3 Option to Erect a Partial By-Pass System for Reheat Only: The Project Manager shall have the option to require the Contractor to erect each Boiler Unit with a Partial By-Pass System for reheat only as referred in Subarticle 3.2.3 of this Document. The increase in erection price, if such option is exercised, shall be:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

AA-001

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$83,800.00
2	78,500.00
3	77,200.00
4	76,000.00

5.3.4 Option to Erect a FC Start-Up System: The Project Manager shall have the option to require the Contractor to erect each Boiler Unit with a FC Start-Up System as referred to in Subarticle 3.2.4 of this Document. The increase in erection price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$172,600.00
2	161,700.00
3	162,600.00
4	163,000.00

5.3.5 Option to Erect a Plasma Torch Direct Ignition System: The Project Manager shall have the option to require the Contractor to erect each Boiler Unit with a Plasma Torch Direct Ignition System as referred to in Subarticle 3.2.5 of this Document. The increase in erection price, if such option is exercise, shall be:

AA-001

<u>Unit No.</u>	<u>Increase in Price</u>
→ 1 Only	\$10,000.00
2	9,800.00
3	9,800.00
4	9,800.00

5.4 DELETED:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

5.5 Option to Erect Primary Air Fans With Variable-Speed Motors: The Project Manager shall have the option to require the Contractor to erect the primary air fans for each Boiler Unit with variable-speed motors as referred to in Subarticle 3.3.6 of this Document. The increase in erection price, if such option is exercised, shall be:

<u>Unit No.</u>	<u>Increase in Price</u>
1	\$ 0.0
2	0.0
3	0.0
4	0.0

5.6 Option for Additional Radiographic Examinations (EARE) for the Erected Boiler Units: If this option is exercised, the Engineer shall have the right to order from time to time during the contractual period additional radiographic examinations of field welds of the erected Boiler Units, as referred to in Subarticle 3(f) of Division G1 of the Specifications, for the following price per hour:

Price
Per Hour

Additional Radiographic Examinations.....\$40

6. Termination Charge Limits: If the IPA exercise the right to terminate as provided for in Article 16 of Division E1 or E2 of the Specifications, the termination charge for each Boiler Unit, based on the delivery of the steam drum for a Boiler Unit specified in Article 2 of Division F1 of the Specifications, shall in no event be greater than the following percentages of the Contract Price adjusted in accordance with Article 19 of Division E1 or E2 of the Specifications:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

Number of Months
Prior to or After
Scheduled Delivery
of the Steam Drum
for a Boiler Unit

Percent of Adjusted
Furnish and Deliver
Contract Price

Percent of Adjusted
Erection Contract
Price, If Option to
Erect is Exercised

*Revised
20.4
3.2.1*

Number of months prior
to scheduled delivery:

24	0.5	--
23	1.0	--
22	1.5	--
21	2.0	--
20	3.0	--
19	4.0	--
18	5.0	0.6
17	6.0	0.8
16	7.0	0.9
15	9.0	1.0
14	11.0	1.5
13	13.0	2.0
12	15.0	3.0
11	17.5	4.0
10	20.5	5.0
9	23.0	6.0
8	26.0	8.0
7	30.0	10.0
6	33.0	12.0
5	35.0	20.0
4	38.0	22.0
3	42.0	24.0
2	45.0	26.0
1	50.0	28.0
0	55.0	30.0

Number of months after
scheduled delivery:

1	60.0	32.0
2	65.0	35.0
3	70.0	39.0
4	75.0	43.0
5	80.0	47.0
6	85.0	51.0
7	90.0	55.0
8	95.0	59.0
9	100.0	63.0

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

7. Manufacturer: Faircock & Wilcox.

7.1 Location of Point of Manufacture: Barberton, Ohio.

8. Established Agents or Representatives:

Name: Richard P. Siegfried, Telephone No. (216) 753-4511

Address: 20 South Van Buren, Barberton, OH 44203

Name: Jack S. Lainq, Telephone No. (714) 978-3272, (213) 384-0283

Address: 2100 East Katella Avenue, Suite 210, Anaheim, CA 92806

Name: Michael D. McCoy, Telephone No. (913) 383-2800

Address: 4370 West 109th Street, Overland Park, KS 66211

Name: James A. Skinner, Telephone No. (801) 864-4441, ext. 539

Address: RFD No. 1, P. O. Box 960, Delta, Utah 84624

Name: C. G. Wood, Telephone No. (801) 864-4441, ext. 539

Address: RFD No. 1, P. O. Box 960, Delta, Utah 84624"

9. Person to Contact: Should the IPA require any explanation concerning details of this proposal, please contact:

Name: Jack S. Lainq, Telephone No. (714) 978-3272, (213) 384-0283

Address: 2100 East Katella Avenue, Suite 210, Anaheim, CA 92806

10. List of Special Tools: The special tools listed below shall be furnished by the Contractor at no increase in price. All tools furnished shall be new and plainly marked for identification.

<u>Item</u>	<u>Quantity</u>	<u>Description</u>
MPS Pulverizers	1	Telescoping Roll Wheel Removal Device
	1 Set	Maintenance Tools (Including Inching Drive)
Boiler	1 Set	Handhole and Manway Wrenches

Note: No special tools are required for installation.

11. Contractor's License: The classification and identifying number of the license issued to the Contractor by the Department of Contractors of the Division of Business Regulation of the State of Utah is Classification #C188 License #031156.

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

12. Data Tabulation:

12.1 Guaranteed Data - Foiler Units: The Contractor guarantees the following data for the Boiler Units to be furnished while operating under steady state conditions at Maximum Capacity as defined in Article 2 of Division G3 and using coal as specified in Article 3 of Division G3 of the Specifications:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

Boiler
Units at
Maximum
Capacity

Minimum Boiler efficiency.....percent *

Maximum total pressure loss from
the air inlet of the air heater
to the furnace.....inches of water *

Maximum pressure loss from the
furnace to the air heater flue
gas outlet.....inches of water *

Maximum pressure drop, excluding
static head, between the IPA's
economizer inlet connection
and the steam drum.....psi *

Maximum total pressure drop between
the steam drum and IPA's superheater
outlet connection.....psi *

Maximum steam pressure drop between the
IPA's connection to the reheater
inlet and outlet.....psi *

Maximum excess air at the air
heater flue gas outlet.....percent *

Maximum dust loading in the flue
gas leaving the economizer.....grains/scf *

Maximum air heater leakage as a percent
of inlet air.....percent *

Auxiliary power requirements:

Number of pulverizers in use..... *

Maximum total power for pulverizer
motors.....kW *

Maximum total power for primary
air fan motors.....kW *

Maximum total power for rotors
not included above.....kW *

* See the performance section of the Contractor's Proposal

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

Boiler
Units

With coal firing, maximum spray water for
steam temperature control at any load under
steady state conditions for the following:

Superheater.....lb/hr *
Reheater.....lb/hr *
Pulverizer capacity at specified fineness.....lb/hr *

12.2 Guaranteed Data - Crtion Furner Management
Control Systems: The Contractor guarantees the following data
for the optional equipment specified hereunder:

12.2.1 Bailey Controls Company:

Voltage requirement to systems cabinet.....V 118
KVA requirement to systems cabinet.....kVA 8.2

The following data shall be for the
conditions specified in Division G5:

Maximum allowable voltage fluctuation:

During a 3-second interval.....V ±10%
On a continuous basis.....V ±10%

Maximum allowable switch time in cycles
to transfer backup power supply into
service at 60 hertz.....cycles On line

Total load required from IPA's
125-volt station battery.....W 0

Ambient temperature range in which
equipment will operate in the cabinet:

Maximum degrees.....C 70
Minimum degrees.....C 0

Maximum loading of components:

Resistors.....percent of rated power N/A
Diodes.....percent of rated power N/A
Transistors.....percent of rated power N/A

* See the performance section of the Contractor's Proposal

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

Boiler
Units

12.2.2 Forney Engineering Company:

Voltage requirement to systems cabinet.....V 120 ac
120 dc

Amperage requirement to systems cabinet.....kVA 7.5

The following data shall be for the
conditions specified in Division G5:

Maximum allowable voltage fluctuation:

During a 3-second interval.....V 120 ac
10-15

On a continuous basis.....V 120 ac
10-15

Maximum allowable switch time in cycles
to transfer backup power supply into service at 60 hertz.....cycles System stays status
quo on transfer

Total load required from IPA's 40 amps max. for 30 milli-
125-volt station battery.....seconds, normal 2 amps

Ambient temperature range in which
equipment will operate in the cabinet:

Maximum degrees.....F 125

Minimum degrees.....F 0

Maximum loading of components:

Resistors.....percent of rated power N/A

Diodes.....percent of rated power N/A

Transistors.....percent of rated power N/A

EXACT VOLTAGES AND AMPERES AVAILABLE WHEN SYSTEM IS FINALLY DESIGNED.

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

12.3 Supplementary Data - Roller Units: In addition to the foregoing Guaranteed Data, the Contractor is furnishing the following Supplementary Data for the Roller Unit to be furnished, based upon Maximum Capacity as defined in Article 2 of Division C) and using coal as specified in Article 3 of Division C):

	Hybrid			Constant Pressure		
Load.....percent of Maximum Capacity	25	50	75	100	MCR	
Superheater outlet pressure.....psig	820	1770	2405	2470	2515	2640
Superheater flow.....Mlb/hr	1525	3050	4575	6100	6600	
Superheater temp.....°F	975	1005	1005	1005	1005	1005
Superheater spray.....lb/hr	0	0	144.0	211.0	75.2	
Drum pressure.....psig	870	1850	2415	2470	2550	2827
Economizer Inlet pressure.....psig	880	1862	2417	2476	2564	2856
Economizer Inlet temperature.....°F	393	459	382	467	507	555
Economizer outlet temperature.....°F	414	482	401	488	527	578
Reheater Inlet flow.....Mlb/hr	1250	2500	1250	2500	3750	5500
Reheater Inlet pressure.....psig	126	266	320	275	402	590
Reheater Inlet temperature.....°F	560	585	440	565	591	630
Reheater spray flow.....lb/hr	0	0	0	0	0	0
Reheater outlet pressure.....psig	118	262	114	262	383	562
Reheater outlet temperature.....°F	900	1005	850	975	1005	1005
Fuel flow.....ton/hr	98.1	190.8	95.5	185.6	269.5	365.2
Number of pulverizers in service.....	2	5	2	5	6	7

*Excluding valves and static head.

Based on P23-310-36Y Drawing with 24-1/2 VI 44
Primary and 33-1/2 VI 64 Secondary Airheaters

	Hybrid	Constant Pressure			
Load.....percent of Maximum Capacity	25	25	50	75	100
Expansion Efficiency.....percent	82	62	72		
Desuperheater spray water temperature...F	299	300	356	378	412
					419

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

C-25a

Load.....percent of Maximum Capacity	Hybrid		Constant Pressure				
	25	50	25	50	75	100	105
Air flow rates:							
Theoretical air for combustion...Mlb/hr	1641	3162	1636	3104	4463	5685	6047
Total air for combustion, including excess air.....Mlb/hr	2257	3952	2248	3880	5266	6538	6954
Air from primary air fans.....Mlb/hr	550.0	1038.5	541.0	1037.5	1293.0	1552.0	1601.0
Tempering air.....Mlb/hr	98.2	370.3	101.1	376.9	425.2	485.8	484.6
Air to primary air heaters.....Mlb/hr	451.8	668.2	439.9	660.6	867.8	1066.2	1116.4
Air from primary air heaters, exclusive of tempering air.....Mlb/hr	300.8	528.2	293.9	521.6	713.8	903.2	947.4
Air from F. D. fans.....Mlb/hr	2066	3305.5	2062	3231.5	4443	5540	5935
Sealing air.....Mlb/hr	22	55	22	55	66	77	77*
Air to secondary air heaters.....Mlb/hr	2066	3305.5	2062	3231.5	4443	5540	5935
Air from secondary air heaters.....Mlb/hr	1880	3108.5	1875.0	3036.5	4193	5226	5599
Air pressures:							
Air from primary air fans, in. of water	30.1	26.0	29.4	25.7	30.1	34.2	36.3
Air to primary air heaters.....in. of water	29.7	24.3	29.0	24.0	28.3	31.5	33.4
Air from primary air heaters.....in. of water	29.5	23.8	28.8	23.5	27.5	30.2	32.0
Air to secondary air heaters.....in. of water	1.8	1.3	1.7	1.2	3.6	5.2	6.0
Air from secondary air heaters.....in. of water	1.4	0.5	1.3	0.4	2.2	3.2	3.7
Air at windbox.....in. of water	1.0	-0.2	0.9	-0.3	0.8	1.1	1.4

*Sealing air is taken from primary tempering air.

Load.....percent of Maximum Capacity	Hybrid		Constant Pressure				
	25	50	25	50	75	100	105
Air temperatures:							
Minimum ambient temperature not requiring preheating.....F	84	60	94	60	50	37	34
Air to secondary air heater.....F	89**	62	99**	62	63	64	65
Air from secondary air heater.....F	534	590	507	590	615	635	645
Air from primary air heater, excluding tempering air.....F	511	562	510	561	567	564	569
Air to pulverizers.....F	420	380	415	375	402	412	420
Air to Primary AH.....F	75	75	75	75	75	77	78
Flue gas flow rates:							
Leaving furnace.....Mlb/hr	2492	4343	2484	4264	5787	7184	7643
Leaving economizer.....Mlb/hr	2509	4375	2500	4295	5832	7241	7703
Entering primary air heaters.....Mlb/hr	363.9	682	439.8	670	839	972	991
Entering secondary air heaters.....Mlb/hr	2145.1	3693	2060.2	3625	4993	6269	6712
Leaving primary air heaters.....Mlb/hr	514.9	822	585.8	809	993	1135	1160
Leaving secondary air heaters.....Mlb/hr	2331.1	3890	2247.2	3820	5243	6583	7048
Maximum velocity of gases in superheater net free area.....ft/sec							
Maximum velocity of gases in reheater net free area.....ft/sec	11	22	11	22	26	45	51
Maximum velocity of gases in economizer net free area.....ft/sec	23	39	28	40	50	46	47
Maximum velocity of gases in economizer net free area.....ft/sec	6	14	4	13	22	36.2	41

**Stem Coil Heating used to heat the air from a temperature of 62 F.

	Hybrid				Constant Pressure			
	25	50	75	100	105			
Load.....Percent of Maximum Capacity								
Flue gas pressures:								
In furnace.....In. of water	0	0	0	0	0			
Leaving furnace.....In. of water	-0.0	-0.0	-0.1	-0.1	-0.1			
Entering economizer.....In. of water	-0.9	-1.5	-2.4	-2.7	-3.1			
Leaving economizer.....In. of water	-1.6	-2.4	-3.7	-4.1	-4.6			
Entering primary air heater.....In. of water	-1.6	-2.4	-3.7	-4.1	-4.6			
Leaving primary air heater.....In. of water	-2.0	-3.4	-5.2	-6.0	-6.4			
Leaving secondary air heater.....In. of water	-2.2	-3.9	-6.2	-7.9	-8.8			
Flue gas temperatures:								
Leaving furnace.....(12" SS)	1190	1480	1170	1470	1815			
Entering superheater.....(24" SS)	1375	1740	1360	1725	2115			
Entering reheater.....(PENDANT)	1092	1330	1064	1325	1625			
Entering economizer.....	589	710	653	723	848			
Leaving economizer.....	581	654	554	653	740			
Entering primary air heater.....	581	654	554	653	740			
Entering secondary air heater.....	581	654	554	653	740			
Leaving primary air heater.....(Incl. PKG)	200	278	237	277	280			
Leaving secondary air heater.....(Incl. PKG)	211	237	203	237	280			

7 MILLER HILLS

	Hybrid		Constant Pressure			
	25	50	25	50	75	100
Load.....percent of Maximum Capacity						105
Excess air:						
Leaving furnace.....percent	42	27	42	27	19.3	16
Leaving economizer.....percent	43	28	43	28	20.3	17
Leaving primary air heater.....percent	64*	39*	63*	39*	29*	26*
Leaving secondary air heater.....percent						
* Pri. and Sec. AH's combined						
Emission concentrations:						
Dust loading avg. Ah's-grains/SCF	4.73	5.52	4.74	5.51	5.88	6.04
Dust loading leaving economizer.....grains/SCF	5.37	5.94	5.37	5.94	6.29	6.44
SO ₂ concentration leaving economizer.....ppm	8.7	9.3	8.5	9.3	9.9	10.1
NO _x leaving economizer.....lb/HMBtu	---	---	Maximum of 0.55 lb/MKB	---	---	---
NO _x leaving air heaters.....lb/HMBtu	Maximum of 0.55 lb/MKB	Maximum of 0.55 lb/MKB (corrected for leakage) across load range.				
Heat absorbed by Boiler:						
Losses:						
Hydrogen in fuel.....percent	4.93	5.10	4.89	5.10	5.13	5.16**
Moisture in fuel.....percent	---	---	---	---	---	---
Moisture in air.....percent	.05	0.06	0.05	0.06	.06	0.07
Dry gas.....percent	3.63	4.57	3.42	4.57	4.74	4.98
Combustible in refuse.....percent	0.20	0.20	0.20	0.20	0.20	0.20
Radiation.....percent	0.57	0.30	0.58	0.30	0.21	0.15
Unaccount & mfg margin.....percent	1	1	1	1	1	1
Total heat absorbed.....percent	10.38	11.23	10.14	11.23	11.34	11.56
Boiler Efficiency (Per ASME PTC 4.1 abbrev. test method)	89.63	88.70	89.87	88.78	88.67	88.45
Fuel efficiency (with heat credits)	89.72	88.88	89.96	88.87	88.76	88.54

**H₂ and H₂O combined

	Hybrid		Constant Pressure			
	25	50	25	50	75	100
Load.....percent of Maximum Capacity						
Power input to motors:						
Number of pulverizers operating.....	2	5	2	5	6	7
Pulverizer motors.....kW	886	1904	876	1886	2494	3152
Number of primary air fans operating.....	1	1	1	1	2	2
Primary air fan motors.....kW	1098(.920)	1341(.935)	1058(.920)	1325(.935)	2132(.933)	2549(.935)▲
Number of coal feeders operating.....	2	5	2	5	6	7
Coal feeder motors.....kW	3	8	3	8	10	11*
Number of boiler circulation pumps operating.....	N/A	N/A	N/A	N/A	N/A	N/A
Boiler circulation pump motors.....kW	N/A	N/A	N/A	N/A	N/A	N/A
All other motors.....kW	103	128	103	128	133	138**

* Based on Merrick Feeders

** Seal Air Fans and Regenerative Air Heaters

▲ Two 24-1/2 VI 44 Primary and Two 33-1/2 VI 64 Secondary's)

() Westinghouse Two Speed Fans (23120D) with Two Speed Motors.

() Indicates Expected Motor Efficiency

unless noted => @ maximum capacity 8/11/82
 Based on 7 Mills in Operation
 Coal Reserve B and F* Coal Reserve F
 B&W Letter
 B&W 8-11-82

Boiler efficiency.....percent	<u>88.82</u>	<u>87.07</u>
Total pressure loss from the air heater air inlet to the furnace.....in. of water	<u>5.3</u>	<u>5.4</u>
Total pressure loss from the furnace to the air heater flue gas outlet.....in. of water	<u>8.3</u>	<u>8.8</u>
Excess air at the economizer outlet.....percent	<u>17</u>	<u>17</u>
Excess air at the air heater gas outlet.....percent	<u>26</u>	<u>26</u>
Dust loading in the flue gas leaving the economizer.....grains/scf	<u>5.21</u>	<u>3.96</u>
Capacity with only 2 pulverizers in service.....percent Maximum Capacity	<u>30</u>	<u>29</u>
Capacity with only 2 pulverizers out of service.....percent Maximum Capacity	<u>100</u>	<u>97</u>
Air flow rates:		
Theoretical air for combustion....Mlb/hr	<u>5781</u>	<u>5880</u>
Total air for combustion including excess air.....Mlb/hr	<u>6651</u>	<u>6762</u>
Air from primary air fans.....Mlb/hr	<u>1533</u>	<u>1600</u>
Tempering air.....Mlb/hr	<u>246</u>	<u>142</u>
Air from primary air heaters excluding tempering air.....Mlb/hr	<u>1111</u>	<u>1260</u>
Air from forced draft fans.....Mlb/hr	<u>5693</u>	<u>5763</u>
Sealing air, from temperature ^{tempering} * air duct.....Mlb/hr	<u>77</u>	<u>77</u>
Air to secondary air heaters.....Mlb/hr	<u>5693</u>	<u>5763</u>
Air from secondary air heaters....Mlb/hr	<u>5371</u>	<u>5437</u>

* Mixture of coals from Coal Reserves B and F on an equal weight basis.

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

* PER EXECUTION LETTER OF C-31
 Aug. 11, 1982

*ditto note
 ⇒ max. capacity on C-31 BHA A-11-82*

Based on 7 Mills

in Operation

Coal Reserve P and F*	Coal Reserve F
-----------------------------	-------------------

Air pressures:

Air from primary air fans...in. cf water	<u>36.8</u>	<u>39.2</u>
Air to primary air heaters...in. cf water	<u>33.9</u>	<u>36.1</u>
Air from primary air heaters.....in. cf water	<u>32.1</u>	<u>34.1</u>
Air to secondary air heaters.....in. of water	<u>5.3</u>	<u>5.4</u>
Air from secondary air heaters.....in. of water	<u>3.1</u>	<u>3.2</u>
Air at windbox.....in. cf water	<u>1.1</u>	<u>1.1</u>

Air temperatures:

155F average
 air heater
 cold end
 temperature
F required

Minimum ambient temperature not requiring air preheating.....F	<u>required</u>	
Air to secondary air heaters.....F	<u>65</u>	<u>65</u>
Air from secondary air heaters.....F	<u>632</u>	<u>628</u>
Air from primary air heaters excluding tempering air.....F	<u>542</u>	<u>536</u>
Air to pulverizers.....F	<u>452</u>	<u>487</u>

Flue gas flow rates:

Leaving economizer.....Mlb/hr	<u>7456</u>	<u>7627</u>
Leaving primary air heaters.....Mlb/hr	<u>1226</u>	<u>1381</u>
Leaving secondary air heaters.....Mlb/hr	<u>6730</u>	<u>6770</u>

Flue gas pressures:

Leaving economizer.....in. cf water	<u>-4.3</u>	<u>-4.5</u>
Leaving primary air.....in. cf water	<u>-6.5</u>	<u>-7.2</u>
Leaving secondary air heaters.....in. cf water	<u>-9.3</u>	<u>-9.4</u>

* Mixture of coals from Coal Reserves B and F on an equal weight basis.
 EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.ext

*ditto note
re: max. capacity
on pg. C-31 BNB 4/11/83*

Based on 7 Mills
in Operation

Coal Reserve E and F*	Coal Reserve F
-----------------------------	-------------------

Flue gas temperatures:

Leaving economizer.....	F	723	723
Leaving primary air heaters, corrected.....	F	279	281
Leaving secondary air heaters, corrected.....	F	273	272

Based on 2 Mills
in Operation

Coal Reserve E and F*	Coal Reserve F
-----------------------------	-------------------

Flue gas exit temperature at 25
percent of Maximum Capacity:

Leaving economizer.....	F	556	557
Leaving primary air heaters.....	F	274	275
Leaving secondary air heaters.....	F	197	194

* Mixture of coals from Coal Reserves B and F on an equal weight basis.

12.4 Supplementary Data - Option for Burner Management Control System: In addition to the foregoing Guaranteed Data, the Contractor is furnishing the following Supplementary Data for the Burner Management Control System specified in Division G5 of the Specifications:

12.4.1 Bailey Controls Company:

Relays:

Make.....	Struthers-Dunn
Model.....	215

Circuit breakers:

Make.....	
Model.....	
Current rating.....	

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Power supply:

I/C P.S., North Electric
Make.....Module P.S., Pioneer
Model.....6063903 MAG 2677
Supply voltage.....-24 Vdc +5Vdc, ± 15 Vdc
+125 Vdc & -30 vdc

Lighted push buttons:

Make.....
Model.....
Current rating.....

Signal converters:

Make..... N/A

Model..... N/A

Accuracy..... N/A

Nickel-cadmium batteries:

Make..... N/A

Model..... N/A

Ampere-hour capacity..... N/A

Weight of systems cabinet.....lb 700 each

Size of systems cabinets:

Length.....in 30 each
Width.....in 24 each
Height.....in 87 each
Clear space above internal equipment.....in Front & rear access

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Integrated circuits:

Maximum fan-out:

Maximum no. of outputs used x 100..percent (Logic performed in
Rated no. of outputs (software/firmware
Typical fan-out: (utilizing type
(6900 microprocessor
No. of outputs used x 100.....percent " "
Rated no. of outputs

Maximum allowable frequency fluctuation.....Hz + 5%

Maximum inrush current to each system
cabinet.....amp 82 kVA (est.)

12.4.2 Forney Engineering Company:

Relays:

Make..... Struthers-Dunn

Model..... Various

Circuit breakers:

Make..... ITE

Model..... Various

Current rating..... Various

Power supply:

Make..... Pioneer Magnetics

Model..... Various

Supply voltage..... 115 and 125 Vdc

Lighted push buttons:

Make..... MS

Model..... 10E

Current rating..... Various

Signal converters:

Make..... N/A

Model.....

Accuracy.....

Nickel-cadmium batteries:

Make..... N/A

Model..... N/A

Ampere-hour capacity..... N/A

Weight of systems cabinet.....lb

Size of systems cabinets:

Length.....in 160 inches

Width.....in 50 inches

Height.....in 90 inches

Clear space above internal equipment.....in 3 inches

Integrated circuits:

Maximum fan-out:

Maximum no. of outputs used x 100..percent N/A
Rated no. of outputs

Typical fan-out:

No. of outputs used x 100.....percent N/A
Rated no. of outputs

Maximum allowable frequency fluctuation.....Hz ± 10%

Maximum inrush current to each system will be determined
cabinet.....amp during design of
system

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TABLE A
SPARE PARTS

*I.D. Requirement
Specify B.H.B.
4/11/83*

b&w ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	b&w FCLIO NUMBER
<u>TUBES, STRAIGHT BARE</u>						
			MATERIAL SPECIFICATION	OUTSIDE DIAMETER x THICK	LENGTH	
1	100	lf	SA213T2CF	2.75 .305	RML	bfg 33.15/lf
2	100	lf	SA210A1CF	2.00 .203	RML	bfg 12.00/lf
3	100	lf	SA210A1CF	2.00 .220	RML	bfg 12.85/lf
4	100	lf	SA213T2CF	2.00 .220	RML	bfg 22.60/lf
5	100	lf	SA213T12CF	2.25 .225	RML	bfg 21.50/lf
6	100	lf	SA213T22CF	2.00 .390	RML	bfg 38.45/lf
7	100	lf	SA213T2CF	2.00 .350	RML	bfg 26.55/lf
8	100	lf	SA213T22CF	2.00 .220	RML	bfg 30.30/lf
9	100	lf	SA213T22CF	2.00 .365	RML	bfg 36.60/lf
10	100	lf	SA213TP347H	2.00 .205	RML	bfg 45.45/lf
11	100	lf	SA213T22CF	2.00 .320	RML	bfg 32.65/lf
12	100	lf	SA213TP347H	2.00 .235	RML	bfg 51.00/lf
13	100	lf	SA213T22CF	2.00 .260	RML	bfg 27.75/lf
14	100	lf	SA213T22CF	2.00 .330	RML	bfg 33.70/lf
15	100	lf	SA213T22CF	2.00 .310	RML	bfg 32.10/lf
16	100	lf	SA213TP304H	2.00 .260	RML	bfg 33.70/lf
17	100	lf	SA213T2CF	2.00 .240	RML	bfg 24.55/lf
18	100	lf	SA213TP347H	2.00 .215	RML	bfg 47.30/lf
19	100	lf	SA213T12CF	2.00 .275	RML	bfg 21.65/lf
20	100	lf	SA213T22CF	2.00 .350	RML	bfg 35.50/lf
21	100	lf	SA213TP304H	2.00 .330	RML	bfg 41.30/lf
22	100	lf	SA213T22CF	2.00 .410	RML	bfg 41.35/lf
23	100	lf	SA213T22CF	1.75 .295	RML	bfg 34.75/lf
24	100	lf	SA213TP304H	1.75 .365	RML	bfg 39.20/lf
25	100	lf	SA213T22CF	1.75 .370	RML	bfg 33.60/lf
26	100	lf	SA213T22CF	1.75 .325	RML	bfg 29.25/lf
27	100	lf	SA213TP347H	1.75 .200	RML	bfg 36.75/lf
28	100	lf	SA213T22CF	1.75 .280	RML	bfg 32.20/lf
29	100	lf	SA213T22CF	1.75 .425	RML	bfg 38.80/lf
30	100	lf	SA213T22CF	1.75 .440	RML	bfg 39.60/lf
31	100	lf	SA213T22CF	1.75 .460	RML	bfg 44.20/lf
32	100	lf	SA213T22CF	1.75 .430	RML	bfg 39.05/lf
33	100	lf	SA213T22CF	1.75 .420	RML	bfg 38.50/lf
34	100	lf	SA210A1CF	2.50 .180	RML	bfg 13.85/lf
35	100	lf	SA213T2CF	2.50 .180	RML	bfg 22.95/lf
36	100	lf	SA213T2CF	2.50 .240	RML	bfg 24.35/lf
37	100	lf	SA213T12CF	2.50 .180	RML	bfg 23.90/lf

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TABLE A
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<u>B&W</u> <u>ITEM</u> <u>NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE</u> <u>PER UNIT</u> <u>OF MEASURE</u>	<u>B&W</u> <u>FOLIO</u> <u>NUMBER</u>
<u>TUBES, STRAIGHT BARE (CONTINUED)</u>						
			<u>MATERIAL</u> <u>SPECIFICATION</u>	<u>OUTSIDE</u> <u>DIAMETER x THICK</u>	<u>LENGTH</u>	
38	100	lf	SA213TP304H	2.50 .180	RML	bfg 33.55/lf
39	100	lf	SA213T22CF	2.50 .180	RML	bfg 30.80/lf
40	100	lf	SA213TP304H	2.00 .180	RML	bfg 21.55/lf
41	100	lf	SA213T22CF	2.00 .180	RML	bfg 25.15/lf
42	100	lf	SA213T9CF	2.00 .275	RML	bfg 44.45/lf
43	100	lf	SA213TP321H	2.00 .180	RML	bfg 33.10/lf
44	100	lf	SA213T9CF	2.00 .220	RML	bfg 46.50/lf
45	100	lf	SA210A1CF MLR	2.50 .260	RML	bfg 22.00/lf
46	100	lf	SA213T2CF MLR	2.50 .260	RML	bfg 34.25/lf
47	100	lf	SA213T2CF MLR	2.50 .255	RML	bfg 33.65/lf
48	100	lf	SA213T2CF	2.50 .255	RML	bfg 25.90/lf
49	100	lf	SA210A1CF	2.75 .340	RML	bfg 21.50/lf
50	100	lf	SA210A1CF MLR	2.75 .290	RML	bfg 25.70/lf
51	100	lf	SA210A1CF	2.75 .280	RML	bfg 18.00/lf

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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>BOILER</u>						
<u>HANDHOLE PLUGS AND FITTINGS</u>						
			<u>SIZE</u>	<u>TYPE</u>	<u>MATERIAL SPECIFICATION</u>	
52	161 ea		3-1/4	Master Handhole	SA182F22	afi 125.00/ea 422230
<u>MANHOLES</u>						
53	12 ea		Manhole Gasket; TP304ASB			afi 6.05/ea 526354
<u>REMOTE LIQUID LEVEL INDICATOR</u>						
54	2 ea		Seal Ring			beg 12.60/ea
55	2 ea		Diaphragm			beg 21.60/ea
56	2 ea		Detection Plate			beg 18.00/ea
57	2 ea		Sealing Plug Gasket			beg 3.60/ea
58	2 ea		Spiral Well Gasket			beg 3.60/ea
59	4 ea		15w Frosted Lamp			beg 10.80/ea
60	4 ea		O-ring for Range Adjusting Screw			beg 5.40/ea
61	2 ea		Mercury Switch			beg 44.10/ea
62	2 ea		Micro Switch			beg 72.90/ea
63	2 ea		Mioget Relay			beg 65.70/ea
64	2 ea		Mioget Relay			beg 81.90/ea
<u>NORMAL WATER LEVEL GAUGE</u>						
65	1 ea		Complete Gauge			bfg 4620.00/ea
<u>HIGH WATER LEVEL GAUGE</u>						
66	1 ea		Complete Gauge			bfg 7572.00/ea
<u>DOORS</u>						
67	2 ea		15 Inch x 21 Inch Access Door, Complete			bfg 1250.00/ea

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TABLE A
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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>VALVES</u>						
<u>FEED STOP VALVE</u>						
66	1	ea	Yoke Sleeve	bfg	1467.00/ea	
69	1	ea	Gland	bfg	434.00/ea	
70	9	ea	Packing	bfg	22.00/ea	
71	2	ea	Eyebolt	bfg	595.00/ea	
72	1	ea	Gasket	bfg	399.00/ea	
73	1	ea	Stem	bfg	5035.00/ea	
74	1	ea	Wedge	bfg	6956.00/ea	
75	1	ea	Thrust Ring	bfg	342.00/ea	
76	1	ea	Junk Ring	bfg	228.00/ea	
77	1	ea	Segment Ring	bfg	2211.00/ea	
78	2	ea	Bearing	bfg	604.00/ea	
<u>FEED CHECK VALVE</u>						
79	1	ea	Hinge	bfg	1065.00/ea	
80	2	ea	Hinge Pin	bfg	192.00/ea	
81	1	ea	Gasket	bfg	382.00/ea	
82	1	ea	Disc	bfg	2520.00/ea	
83	1	ea	Thrust Ring	bfg	504.00/ea	
84	1	ea	Segment Ring	bfg	2211.00/ea	
85	1	ea	Locking Device	bfg	123.00/ea	

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TABLE A
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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>VALVES</u>						
STEAM GAUGE DRAIN VALVE, WATER GAUGE DRAIN VALVE, DRUM LEVEL CONTROL VALVE, STEAM GAUGE VALVE, STEAM GAUGE SHUT-OFF VALVE, STEAM GAUGE TEST VALVE, PRESSURE CONTROL VALVE, STEAM SAMPLING VALVE, WATER SAMPLING VALVE, CHEMICAL FEED VALVE, ROOF INLET HEADER DRAIN VALVE, SECONDARY SUPERHEATER INLET HEADER DRAIN VALVE, PRIMARY SUPERHEATER OUTLET PIPE VENT VALVE, ECONOMIZER DISCHARGE LINE VENT VALVE, REHEAT OUTLET PIPE VENT VALVE, PSH OUTLETS BEFORE ATTEMPORATOR PRESSURE INDICATOR SHUT-OFF VALVES, ECONOMIZER INLET PRESSURE TEST VALVE, ECONOMIZER DISCHARGE LINE PRESSURE TEST VALVE, PRIMARY SUPERHEATER PRESSURE TEST VALVE, REHEAT INLET HEADER PRESSURE TEST VALVE, PSH OUTLETS AFTER 500 VALVES PRESSURE INDICATOR SHUT-OFF VALVE, SECONDARY SUPERHEATER PLATEN OUTLET HEADER VENT VALVE, SSH PLATEN OUTLETS BEFORE ATTEMPORATOR PRESSURE INDICATOR SHUT-OFF VALVE, CONUMIZER INLET WATER SAMPLING VALVE, DRUM NITROGEN VALVE, ATTEMPORATOR PIPING NITROGEN VALVE, SECONDARY SUPERHEATER PLATEN OUTLET HEADER NITROGEN VALVE						
86	15 ea		1 Inch Valve, Complete	beg	224.00/ea	
<u>PARTS FOR ABOVE VALVE</u> (Alternate to Complete Valve)						
87	15 ea		Stuffing Box Bushing	beg	23.00/ea	
88	15 ea		back Seat bushing	beg	54.00/ea	
89	15 ea		Solid Disc and Stem Assembly	beg	155.00/ea	
90	15 ea		Back Seat Bushing Gasket	beg	5.00/ea	
91	300 ea		Packing	beg	17.00/ea	

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B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>VALVES</u>						
<u>NORMAL WATER LEVEL GAUGE SU VALVE, HIGH WATER LEVEL GAUGE SU VALVE, VENT VALVE, CONTINUOUS BLOWDOWN VALVE, CONTINUOUS BLOWDOWN THROTTLING VALVE, SECONDARY SUPERHEATER PLATEN INLET HEADER DRAIN VALVE, REHEAT SUPERHEATER INLET HEADER DRAIN VALVE, REHEAT SUPERHEATER OUTLET HEADER DRAIN VALVE</u>						
92	4 ea		1-1/2 Inch Valve, Complete	beg	533.00/ea	
<u>PARTS FOR ABOVE VALVES (Alternate to Complete Valve)</u>						
93	4 ea		Stuffing box Bushing	beg	35.00/ea	
94	4 ea		back Seat bushing	beg	77.00/ea	
95	4 ea		Solid Disc and Stem Assembly	beg	416.00/ea	
96	4 ea		back Seat bushing Gasket	beg	14.00/ea	
97	76 ea		Packing	beg	44.00/ea	
<u>AUXILIARY STEAM VALVE, END DOWNCOMER DRAIN VALVE, SHELL DOWNCOMER DRAIN VALVE, ECONOMIZER INLET HEADER DRAIN VALVE, LOWER CONVECTION PASS HEADER DRAIN VALVE, BOILER SOOTBLOWER SYSTEM EMERGENCY SHUT-OFF VALVE</u>						
98	4 ea		3 Inch Valve, Complete	beg	1645.00/ea	
<u>PARTS FOR ABOVE VALVES (Alternate to Complete Valve)</u>						
99	4 ea		Stuffing box Bushing	beg	67.00/ea	
100	4 ea		back Seat bushing	beg	162.00/ea	
101	4 ea		Solid Disc and Stem Assembly	beg	631.00/ea	
102	4 ea		back Seat bushing Gasket	beg	17.00/ea	
103	60 ea		Packing	beg	65.00/ea	

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TABLE A
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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>VALVES</u>						
<u>ERV. PRESSURE SENSING CONNECTION DRAIN VALVE, ERV. PRESSURE SENSING SHUT-OFF VALVE, SECONDARY SUPERHEATER OUTLET PIPE VENT VALVE, SECONDARY SUPERHEATER OUTLET PIPE NITROGEN VALVE</u>						
104	2 ea		1 Inch Valve, Complete	beg	346.00/ea	
<u>PARTS FOR ABOVE VALVES (Alternate to Complete Valve)</u>						
105	2 ea		Stuffing box bushing	beg	23.00/ea	
106	2 ea		back Seat bushing	beg	54.00/ea	
107	2 ea		Solid Disc and Stem Assembly	beg	155.00/ea	
108	2 ea		back Seat bushing Gasket	beg	5.00/ea	
109	40 ea		Packing	beg	17.00/ea	
<u>SECONDARY SUPERHEATER OUTLET HEADER DRAIN VALVE, AIRHEATER SOOTBLOWER SYSTEM EMERGENCY SHUT-OFF VALVE</u>						
110	1 ea		1-1/2 Inch Valve, Complete	beg	720.00/ea	
<u>PARTS FOR ABOVE VALVES (Alternate to Complete Valve)</u>						
111	1 ea		Stuffing Box Bushing	beg	35.00/ea	
112	1 ea		back Seat bushing	beg	77.00/ea	
113	1 ea		Solid Disc and Stem Assembly	beg	416.00/ea	
114	1 ea		back Seat bushing Gasket	beg	14.00/ea	
115	12 ea		Packing	beg	44.00/ea	
<u>DRUM SAFETY VALVE</u>						
116	32 ea		Disc	bfg	346.37/ea	
117	4 ea		Upper Adjusting Ring	bfg	396.68/ea	
118	4 ea		Lower Adjusting Ring	bfg	185.76/ea	
119	32 ea		Upper Adjusting Ring Pin	beg	32.90/ea	
120	32 ea		Lower Adjusting Ring Pin	beg	36.77/ea	
121	16 ea		Spindle	bfg	460.53/ea	
122	4 ea		Guide	bfg	793.35/ea	
123	4 ea		Overlap Collar	bfg	102.56/ea	
124	4 ea		Holder	bfg	663.71/ea	

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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>VALVES</u>						
<u>SECONDARY SUPERHEATER OUTLET SAFETY VALVE</u>						
125	8 ea		Disc	bfg	332.10/ea	
126	1 ea		Upper Adjusting Ring	bfg	348.30/ea	
127	1 ea		Lower Adjusting Ring	bfg	200.70/ea	
128	6 ea		Upper Adjusting Ring Pin	beg	39.60/ea	
129	8 ea		Lower Adjusting Ring Pin	beg	39.60/ea	
130	1 ea		Spindle	bfg	1,329.30/ea	
131	4 ea		Guide	bfg	501.30/ea	
132	1 ea		Holder	bfg	1,453.50/ea	
133	1 ea		Overlap Collar	bfg	102.60/ea	
<u>SECONDARY SUPERHEATER OUTLET SAFETY VALVE</u>						
134	8 ea		Disc	bfg	346.37/ea	
135	1 ea		Upper Adjusting Ring	bfg	396.68/ea	
136	1 ea		Lower Adjusting Ring	bfg	185.76/ea	
137	8 ea		Upper Adjusting Ring Pin	beg	32.90/ea	
138	8 ea		Lower Adjusting Ring Pin	beg	36.77/ea	
139	1 ea		Spindle	bfg	460.53/ea	
140	4 ea		Guide	bfg	1354.22/ea	
141	1 ea		Holder	bfg	1211.26/ea	
142	1 ea		Overlap Collar	bfg	102.56/ea	
<u>ELECTROMATIC RELIEF VALVE</u>						
143	2 ea		Pilot Disc Assembly	bfg	528.00/ea	
144	2 ea		Pilot Spring	bfg	16.50/ea	
145	2 ea		Pilot Seat Bushing Gasket	beg	28.50/ea	
146	2 ea		Main Valve Disc	bfg	915.00/ea	
147	2 ea		Main Spring	bfg	234.00/ea	
148	2 ea		Main Seal Ring	bfg	178.50/ea	
149	2 ea		Pilot Seat Bushing	beg	1291.50/ea	
150	2 ea		Pilot Spring Cover	beg	48.00/ea	
151	2 ea		Main Seat Bushing	beg	2602.00/ea	

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TABLE A
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B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	San FOLIO NUMBER
<u>VALVES</u>						
<u>REHEAT INLET SAFETY VALVE</u>						
152	8 ea		Disc	bfg	955.00/ea	
153	8 ea		Upper Adjusting Ring	bfg	1053.00/ea	
154	8 ea		Lower Adjusting Ring	bfg	335.00/ea	
155	8 ea		Upper Adjusting Ring Pin	beg	40.00/ea	
156	8 ea		Lower Adjusting Ring Pin	beg	40.00/ea	
157	2 ea		Spindle	bfg	1431.00/ea	
158	6 ea		Guide	bfg	2032.00/ea	
159	2 ea		Overlap Collar	bfg	215.00/ea	
160	6 ea		Holder	ufg	1710.00/ea	
<u>REHEAT OUTLET SAFETY VALVE</u>						
161	4 ea		Disc	bfg	955.00/ea	
162	4 ea		Upper Adjusting Ring	bfg	1053.00/ea	
163	4 ea		Lower Adjusting Ring	bfg	335.00/ea	
164	4 ea		Upper Adjusting Ring Pin	beg	40.00/ea	
165	4 ea		Lower Adjusting Ring Pin	beg	40.00/ea	
166	1 ea		Spindle	bfg	1431.00/ea	
167	4 ea		Guide	bfg	3901.00/ea	
168	1 ea		Overlap Collar	bfg	215.00/ea	
169	4 ea		Holder	bfg	3876.00/ea	

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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>BURNERS - DUAL REGISTER</u>						
<u>PARTS FOR BURNER</u>						
170	46 ea		Observation Door Glass 3-7/16 Inch Outside Diameter x 3/16 Thick	adi	3.50/ea	430308
171	8 ea		Deflector with Inserts, Hex Bolts, and Washers	bfn	175.00/ea	
172	6 ea		Conical Diffuser with Plug Cap, Stud, End Plate, Hex Nuts, Lockwashers, Mounting Bracket, Socket Head Cap Screws	bfn	360.00/ea	
173	1 st		Register Air Doors and Linkage for One (1) Dual Register Burner	bfg	2560.00/st	
<u>OIL LIGHTER</u>						
174	4 ea		Oil Lighter	cfg	2525.00/ea	
175	2 ea		Cylinder Style 6 with Standard Rings 3 Inch Bore 20 Inch Stroke	beg	254.00/ea	
176	2 ea		Cylinder Style 6 with Standard Rings 2 Inch Bore 20 Inch Stroke	beg	152.25/ea	
177	8 ea		Ignition System Exciter	cog	820.00/ea	426515
178	4 ea		25 Feet Cable	bog	83.75/ea	
179	1 ea		Probe Assembly with Igniter Tip	cog	708.65/ea	
180	4 ea		Gasket Compress Asbestos	bdi	.75/ea	526234
181	4 lf		Packing Square Asbestos braided	bci	.80/lf	526457
182	6 lf		Packing Square Asbestos Garloc	boi	.55/lf	526443
<u>WATER ATOMIZER</u>						
183	2 ea		Atomizer Assembly	bfg	1325.00/ea	
<u>PARTS FOR ATOMIZER</u>						
184	16 ea		Sprayer Plate	ofi	100.40/ea	427170
185	192 ea		Gasket Dual Flow Garloc	adi	.55/ea	526015
186	16 ea		Atomizer End Cap	afi	27.40/ea	426160

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<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
			<u>MPS-89GR PULVERIZER</u>			
187	1 ea		Gearbox Assembly	cfg	228925.00/ea	
			Alternate: Set of Gears and Bearings for Gearbox	bfg	123888.00/st	
188	2 ea		Split Oil Seal for Gearbox Outlet Flange	aei	234.30/ea	526631
189	2 ea		Oil Seal for Gearbox Input Flange	aei	5.85/ea	526629
190	1 ea		Seal Sleeve for Gearbox Input Shaft	aei	4.25/ea	526628
191	2 st		Coupling Grid Members Only for Pulverizer Gear Drive Coupling Number 140T20	cfg	160.00/st	
192	2 ea		Motor 5 horsepower 1750 RPM, Frame 184T-F2 for Gearbox Lube Console	afg	223.00/ea	456084
193	2 ea		Pump for Gearbox Lube Console	afg	828.00/ea	458601
194	14 ea		Oil Filter Element for Gearbox Lube Console	adi	44.10/ea	458217
195	12 ea		Oil Filter Assembly for Gearbox Lube Console	bdi	2163.00/ea	458213
196	96 ea		Ring Segment, Elverite I	bfh	1696.00/ea	
197	100 ea		wedge bolt, 1-1/2 Inch Diameter x 10 Inch Long with 3-1/4 Inch x 2-3/8 Inch x 4 Inch Head, SA-19307; for Ring Segment	adi	24.91/ea	491532
198	100 ea		Heavy Hex Nut, 1-1/2 Inch, SA-194-2H, for Ring Segment	adi	4.40/ea	491635
199	200 ea		Hardened Washer, 2-3/4 Inch Outside Diameter x 1-9/16 Inch Inside Diameter x 3/8 Inch, for Ring Seat	adi	3.66/ea	493550
200	24 ea		Ring Seat Seal Segment	bei	306.00/ea	
201	6 ea		Yoke Air Seal with Cap Screws and washers	bfg	3967.00/ea	
202	84 ft		Round Packing, Asbestos 1-1/2 Inch Diameter for Yoke Seal	adi	12.46/ft	526475
203	56 ea		Upper Throat Casting	ceh	475.00/ea	
204	24 ea		Tire 70 Inch Elverite I for Roll Wheel Assembly	cfh	12938.00/ea	
205	6 ea		Position 10 bearing, Floating for Roll Wheel Assembly	afg	1658.00/ea	456430
206	6 ea		Position 11 bearing, Fixed for Roll Wheel Assembly	afg	1658.00/ea	456431
207	24 ea		Klosure Assembly for Roll Wheel Assembly	afg	381.00/ea	526600

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>MPS-89GR PULVERIZER (CONTINUED)</u>						
208	6 ea		Air Roll Seal for Roll Wheel Assembly	afg	411.10/ea	458438
209	6 ea		Sleeve Seal with Noroc Coating for Roll Wheel Assembly	afg	494.00/ea	458483
210	24 ea		O-Ring Silicone 18-1/2 Inch Outside Diameter, for Roll Seal Retainer	adi	15.70/ea	526415
211	24 ea		O-Ring Silicone 19-1/4 Inch Outside Diameter, for bearing Cover	adi	10.60/ea	526413
212	46 ea		O-Ring Silicone 11-3/4 Inch Outside Diameter, for Roll Shaft	adi	5.95/ea	526409
213	3 ea		Roll Wheel Assembly	cfh	40227.00/ea	
214	6 ea		Wire Rope Assembly	bfb	403.00/ea	
215	6 ea		Pull Down Eye Assembly	afh	218.00/ea	458010
216	58 ft		Wool Felt Gasket 1-1/2 Inch x 1/2 Inch for Maintenance Door	adi	.32/ft	526618
217	42 ft		Wool Felt Gasket 1-1/2 Inch x 1/2 Inch for Cable Access Door	adi	.32/ft	526618
218	24 ea		Packing Ring, 3 Inch Inside Diameter x 4 Inch Outside Diameter x 1/2 Inch Square for Loading Rod	adi	4.40/ea	526441
219	10 ft		Wool Felt Gasket 1-1/2 Inch x 1/2 Inch for Access Door	adi	.32/ft	526618
220	6 st		Ceramic Lined Panels for Intermediate Housing	ceh	8800.00/st	
221	4 ea		Ceramic Lined Classifier Cone	ceh	7800.00/ea	
222	40 ea		Swing Valve Seat and Gasket Assembly	aei	174.00/ea	458501
223	64 ea		Replacement Liner for Turret Liner	coh	185.00/ea	
224	12 ea		Swing Valve Air Cylinder Operator with Clevis	beg	575.00/ea	

TABLE A
SPARE PARTS

<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
225	2	st	<u>PULVERIZER SEAL AIR BLOWER MOTOR</u> Front and Rear bearing	beg	859.00/st	
			<u>PULVERIZER MOTOR DRIVES</u>			
226	1	ea	Stator Assembly	cfg	22180.00/ea	
227	3	ea	Shaft End bearing	cfg	1430.00/ea	
228	3	ea	Opposite End bearing	cfg	1367.00/ea	
229	3	st	Oil Guards	bfg	1135.00/st	
			<u>PRIMARY AIR FANS</u>			
230	2	ea	8 Inch Heavy Duty Sleeve Bearings	cfg	12350.00/ea	
231	4	ea	8 Inch Heavy Duty Sleeves	cfg	5790.00/ea	
			<u>PRIMARY AIR FAN DRIVES</u>			
232	2	ea	Rear bearing (6x6 Uninsulated)	cfg	5520.00/ea	
233	2	ea	Front bearing (5x5 Uninsulated)	cfg	5920.00/ea	
234	4	ea	Sight window	beg	12.75/ea	
235	4	ea	Thermocouple	beg	489.27/ea	
236	4	ea	Space heater	beg	51.24/ea	
237	4	ea	Space Heater	beg	93.64/ea	
238	4	ea	Vibration Detector Assembly	beg	552.47/ea	

TABLE A
SPARE PARTS

<u>B&W</u> <u>ITEM</u> <u>NUMBER</u>	<u>QTY</u> <u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE</u> <u>PER UNIT</u> <u>OF MEASURE</u>	<u>B&W</u> <u>FOLIO</u> <u>NUMBER</u>
<u>RECOMMENDED SPARE PARTS FOR IK-525B</u> <u>AND IK-545B BLOWERS</u>					
<u>CARRIAGE PARTS</u>					
239	10 ea	Motor Gasket	bfg	0.75/ea	
240	10 ea	Housing Gasket	bfg	0.45/ea	
241	10 ea	Gasket	bfg	1.70/ea	
242	10 ea	Bearing Retainer Gasket	bfg	0.45/ea	
243	10 ea	Cover Plate Gasket	bfg	0.45/ea	
244	10 ea	Shim Blue	bfg	0.35/ea	
245	10 ea	Shim Transparent	bfg	0.40/ea	
246	10 ea	Shim Yellow	bfg	0.60/ea	
247	10 ea	Shim	bfg	2.30/ea	
248	10 ea	Shim Blue	bfg	0.45/ea	
249	10 ea	Shim Transparent	bfg	0.70/ea	
250	10 ea	Shim Yellow	bfg	1.35/ea	
251	10 ea	Shim Blue	bfg	0.35/ea	
252	10 ea	Shim Transparent	bfg	0.40/ea	
253	10 ea	Shim Yellow	bfg	0.60/ea	
254	10 ea	Retaining Ring	bfg	0.40/ea	
255	10 ea	Retaining Ring	bfg	4.00/ea	
256	10 ea	Retaining Ring	bfg	3.15/ea	
257	10 ea	Retaining Ring	bfg	0.40/ea	
258	10 ea	Retaining Ring	bfg	0.75/ea	
259	10 ea	Retaining Ring	bfg	0.40/ea	
260	10 ea	Retaining Ring	bfg	0.45/ea	
261	10 ea	Retaining Ring	bfg	1.95/ea	
262	28 ea	Feed Tube Packing	bfg	16.20/ea	
263	72 ea	Feed Tube Packing	bfg	56.25/ea	
264	10 ea	Ball bearing	bfg	113.40/ea	
265	10 ea	Ball bearing	bfg	6.30/ea	
266	10 ea	Ball bearing	bfg	9.40/ea	
267	10 ea	Ball bearing	bfg	14.60/ea	
268	10 ea	Ball bearing	bfg	12.10/ea	
269	10 ea	Ball bearing	bfg	12.65/ea	
270	10 ea	Ball bearing	bfg	13.90/ea	
271	10 ea	Ball bearing	bfg	17.45/ea	
272	10 ea	Roller	bfg	43.00/ea	
273	10 ea	Roller	bfg	31.50/ea	
274	10 ea	Key	bfg	1.35/ea	
275	10 ea	Key	bfg	4.95/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>RECOMMENDED SPARE PARTS FOR IK-5256 AND IK-5456 BLOWERS</u>						
<u>CARRIAGE PARTS (CONTINUED)</u>						
276	10 ea		Key	bfg	0.85/ea	
277	10 ea		Pinion	bfg	39.60/ea	
278	10 ea		Oil Seal	bfg	3.35/ea	
279	10 ea		Groove Pin	bfg	0.25/ea	
280	10 ea		Trip Stud - EMD	bfg	6.50/ea	
281	10 ea		Oil Seal	bfg	3.35/ea	
282	10 ea		Oil Sight Gauge	bfg	11.10/ea	
283	10 ea		Oil Seal	bfg	9.40/ea	
284	3 ea		Feed Tube Bushing	bfg	23.55/ea	
285	3 ea		Feed Tube Packing Glano	bfg	30.35/ea	
286	7 ea		Feed Tube bushing	bfg	59.40/ea	
287	7 ea		Feed Tube Packing Glano	bfg	53.10/ea	
288	10 ea		Spur Gear	bfg	76.30/ea	
289	10 ea		Spur Gear	bfg	75.60/ea	
290	2 ea		Carriage Assembly Right Hand	bfg	49.05/ea	
291	2 ea		Carriage Assembly Left Hand	bfg	49.05/ea	
<u>TRACK BEAM PARTS</u>						
292	12 ea		Gear Rack, Welded, 6 Foot Length	bfg	113.40/ea	
<u>POPPET VALVE PARTS</u>						
293	10 ea		Poppet Valve	bfg	741.60/ea	
294	10 ea		Valve Stem and Disc Assembly	bfg	60.30/ea	
295	10 ea		Air Relief Valve Assembly	bfg	99.90/ea	
296	20 ea		Packing Washer	bfg	4.35/ea	
297	20 ea		Valve Guide Washer	bfg	0.70/ea	
298	20 ea		Valve Yoke	bfg	0.85/ea	
299	20 ea		Lock Pin Plug	bfg	4.65/ea	
300	20 ea		Lock Pin Plug	bfg	10.05/ea	
301	100 ea		Valve Stem Packing	bfg	1.50/ea	
302	20 ea		Valve Spring	bfg	2.85/ea	
303	100 ea		Flange Gasket	bfg	6.40/ea	
304	20 ea		Valve Spring Retainer	bfg	0.85/ea	
305	20 ea		Pin-Yoke	bfg	0.60/ea	
306	20 ea		Pin-Trigger	bfg	1.50/ea	
307	6 ea		Feed Tube Gasket	bfg	1.45/ea	
308	15 ea		Feed Tube Gasket	bfg	6.65/ea	

TABLE A
SPARE PARTS

<u>B&W</u> <u>ITEM</u> <u>NUMBER</u>	<u>QTY</u> <u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE</u> <u>PER UNIT</u> <u>OF MEASURE</u>	<u>B&W</u> <u>FIGURE</u> <u>NUMBER</u>
<u>RECOMMENDED SPARE PARTS FOR 1K-525B</u> <u>AND 1K-545B BLOWERS</u>					
<u>MOTOR AND CONTROL</u>					
309	5 ea	Electric Motor	bfg	327.60/ea	
310	10 ea	Limit Switch LSF or LSF and LSR	bfg	106.20/ea	
311	5 ea	Limit Switch LSR Left Hand	bfg	162.90/ea	
312	5 ea	Limit Switch LSR Right Hand	bfg	151.20/ea	
313	10 ea	Actuating Lever	bfg	12.35/ea	
314	10 ea	1/4 Inch - 20 Nylok Nut	bfg	0.25/ea	
315	5 ea	Expansion Cable Assembly Right Hand	bfg	216.70/ea	
316	5 ea	Expansion Cable Assembly Left Hand	bfg	216.70/ea	
317	20 ea	Shaft Roller	bfg	16.20/ea	
318	20 ea	Bearing	bfg	8.00/ea	
319	10 ea	Retaining Ring	bfg	0.60/ea	
320	6 ea	Front Support Roller	bfg	55.80/ea	
321	15 ea	Front Support Roller	bfg	55.80/ea	
<u>FEED TUBE, LANCE TUBE AND NOZZLE</u>					
322	10 ea	Nozzle Assembly	bfg	459.00/ea	
323	10 ea	Feed Tube Assembly	bfg	3,109.50/ea	
324	2 ea	Feed Tube Assembly	bfg	1,737.90/ea	
325	6 ea	Lance Tube Assembly	bfg	4,671.00/ea	
326	2 ea	Lance Tube Assembly	bfg	10,714.50/ea	
327	2 ea	Lance Tube Assembly	bfg	1,565.10/ea	
<u>RECOMMENDED SPARE PARTS</u> <u>FOR MODEL 1K-3 BLOWERS</u>					
328	3 ea	Cam Standard	bfg	144.00/ea	
329	3 ea	Roller Assembly	bfg	4.50/ea	
330	3 ea	Guide Bar	bfg	62.10/ea	
331	9 ea	Spring	bfg	1.25/ea	
332	9 ea	Retaining Screw	bfg	10.10/ea	
333	9 ea	Pawl with Bearing	bfg	22.75/ea	
334	18 ea	Drive Pin	bfg	1.95/ea	
335	5 ea	Lock Washer	bfg	0.35/ea	
336	5 ea	Retaining Screw	bfg	12.80/ea	
337	2 ea	Drive Gear	bfg	162.00/ea	
338	9 ea	Drive Key	bfg	5.40/ea	
339	9 ea	Pinion	bfg	21.85/ea	
340	9 ea	Pinion Shaft Pin	bfg	1.10/ea	
341	5 ea	Feed Tube	bfg	133.20/ea	
342	45 ea	Feed Tube Packing	bfg	15.55/ea	

TABLE A
SPARE PARTS

<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FULIO NUMBER</u>
<u>RECOMMEND SPARE PARTS FOR MODEL 1R-3 BLOWERS (CONTINUED)</u>						
343	9 ea		Feed Tube Flange Gasket	bfg	0.85/ea	
344	9 ea		Valve Disc and Stem Assembly	bfg	60.30/ea	
345	45 ea		Valve Stem Packing	dfg	1.50/ea	
346	4 ea		Square D Limit Switch (LSR)	bfg	42.30/ea	
347	4 ea		Square D Limit Switch (LSF)	bfg	42.30/ea	
348	10 ea		Valve Spring	bfg	2.85/ea	
349	10 ea		Valve Spring Retainer	bfg	0.85/ea	
350	10 ea		Lock Pin Plug	bfg	4.75/ea	
351	10 ea		Valve Yoke	dfg	0.85/ea	
352	10 ea		Packing Washer	dfg	4.35/ea	
353	10 ea		Trigger Pin	dfg	1.50/ea	
354	10 ea		Yoke Pin	bfg	0.60/ea	
355	2 ea		Trigger Stancard	bfg	56.70/ea	
356	45 ea		Campanion Flange Gasket	bfg	6.40/ea	
357	3 ea		Lock Nut	bfg	9.90/ea	
358	5 ea		Nozzle Assembly	bfg	226.80/ea	
359	9 ea		Air Relief Valve	bfg	59.40/ea	
360	2 ea		Electric Motor 1/6 Horsepower	bfg	191.70/ea	
<u>RECOMMENDED SPARES FOR THERMOPROBE</u>						
361	1 ea		Thermocouple Assembly	bfg	743.40/ea	
<u>RECOMMENDED SPARE PARTS FOR CUSTOM MICROPROCESSOR</u>						
362	1 ea		CPU Module	bfg	776.70/ea	
363	1 ea		General Purpose I/O Module	bfg	1,204.20/ea	
364	1 ea		Digital I/O Module	bfg	1,051.20/ea	
365	1 ea		Operation Monitor Module	bfg	216.90/ea	
366	20 ea		Lamp, 28 Volts	bfg	3.70/ea	
367	20 ea		Lamp, 28 Volts	bfg	2.20/ea	
368	20 ea		Fuse	bfg	0.85/ea	
369	1 ea		RUM/RAM Memory Module	bfg	1,254.60/ea	

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>PRIMARY AIR HEATERS</u>						
370	6 st		Radial Seals for Cold End of Rotor Only	bfg	567.00/st	
371	8 st		Holding Strips for Cold End Radial Seals	bfg	198.90/st	
372	8 st		Cold End Rotor Post Seals	bfg	54.00/st	
373	6 st		Bolts, Nuts and Washers for Cold End of Rotor Only	bfg	135.00/st	
374	6 st		Circular Seals for Cold End of Rotor Only	bfg	280.80/st	
375	8 st		Holding Strips for Circular Seals for Cold End of Rotor Only	bfg	122.40/st	
376	6 st		Circular Seals, Bolts, Nuts and Washers for Cold End of Rotor	bfg	68.40/st	
377	8 st		Axial Seal for Hot and Cold End of Rotor	bfg	191.70/st	
378	8 st		Holding Strips for Axial Seals, Hot and Cold Ends of Rotor	bfg	127.80/st	
379	8 st		bolts, Nuts and Washers for Axial Seal	bfg	99.00/st	
380	8 st		Radial Seals for Hot End of Rotor Only	bfg	567.00/st	
381	8 st		Holding Strips for Hot End Radial Seals	bfg	198.90/st	
382	8 st		Hot End Rotor Post Seals	bfg	54.00/st	
383	6 st		bolts, Nuts and Washers for Hot End Radial Seals	bfg	135.00/st	
384	6 st		Circular Seals for Hot End of Rotor Only	bfg	280.80/st	
385	8 st		Holding Strips for Circular Seals for Hot End of Rotor Only	bfg	122.40/st	
386	6 st		Circular Seals, Bolts, Nuts and Washers for Hot End of Rotor	bfg	68.40/st	
<u>AIR HEATER BLOWERS</u>						
387	1 ea		Diaphragm	afg	48.47/ea	
388	1 ea		Valve Disc and Stem Assembly	afg	62.85/ea	
389	1 ea		Valve Guide Washer	afg	.69/ea	
390	1 ea		Trigger Pin	afg	1.55/ea	
391	1 ea		Valve Spring	afg	3.16/ea	
392	1 ea		Valve Spring Retainer	afg	.86/ea	
393	1 ea		Valve Yoke	afg	.92/ea	
394	1 ea		Yoke Pin	afg	.63/ea	
395	1 ea		Packig washer	afg	4.54/ea	
396	1 ea		Lock Pin Plug	afg	10.47/ea	
397	1 ea		Air Relief Valve	afg	119.49/ea	
398	2 ea		Flange Gasket	afg	65.90/ea	

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>PRIMARY AIR HEATERS</u>						
<u>AIR HEATER DRIVE, BEARINGS AND LUBE UNIT</u>						
399	1	lt	Drive Unit	cfg	72260.00/lt	
400	1	ea	Air Motor	bfg	Inc'l	
401	1	ea	Overrunning Clutch Coupling	bfg	Inc'l	
402	1	ea	Electric Motor	cfg	Inc'l	
403	1	ea	Gear Coupling	bfg	Inc'l	
404	4	ea	Solenoid Air Valve	afg	Inc'l	
405	2	ea	Rotor Guide Bearing	cfg	Inc'l	
406	1	ea	Rotor Support Bearing Runner	cfg	Inc'l	
407	1	ea	Rotor Support Bearing Shoes	cfg	Inc'l	
408	1	ea	Lube Oil Motor for Support Bearing	cfg	Inc'l	
409	1	ea	Lube Oil Motor for Guide Bearing	cfg	Inc'l	
410	1	ea	Lube Oil Pump for Support Bearing	cfg	Inc'l	
411	1	ea	Lube Oil Pump for Guide Bearing	cfg	Inc'l	
412	1	ea	Lube Oil Cooler for Guide Bearing	cfg	Inc'l	
413	4	ea	Immersion Thermostats	beg	Inc'l	
414	4	ea	Lube Oil Filter Cartridges	adg	Inc'l	
415	1	ea	Lube Oil Drive Coupling	bfg	Inc'l	
416	1	ea	Lube Oil Drive Coupling	bfg	Inc'l	
417	1	ea	Dial Thermometer	adi	Inc'l	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>SECONDARY AIR HEATERS</u>						
418	8 st		Radial Seals for Cold End of Rotor Only	bfg	2506.50/st	
419	8 st		Holding Strips for Cold End Radial Seals	bfg	885.60/st	
420	8 st		Diaphragm Seals for Cold End of Rotor Only	bfg	1982.70/st	
421	8 st		Bolts, Nuts and Washers for Cold End of Radial Seals	bfg	635.40/st	
422	8 st		By-Pass Seals for Cold End of Rotor Only	bfg	980.10/st	
423	8 st		Holding Strips for By-Pass Seals for Cold End of Rotor Only	bfg	248.40/st	
424	8 st		By-Pass Seals, Bolts, Nuts and Washers for Cold End of Rotor	bfg	127.80/st	
425	8 st		Axial Seal for Hot and Cold End of Rotor	bfg	396.90/st	
426	8 st		Holding Strips for Axial Seals, Hot and Cold Ends of Rotor	bfg	779.40/st	
427	8 st		Bolts, Nuts and Washers for Axial Seal	bfg	170.10/st	
428	8 st		Radial Seals for Hot End of Rotor Only	bfg	2506.50/st	
429	8 st		Holding Strips for Hot End Radial Seals	bfg	885.60/st	
430	8 st		Diaphragm Seals for Hot End of Rotor Only	bfg	1982.70/st	
431	8 st		Bolts, Nuts and Washers for Hot End Radial Seals	bfg	635.40/st	
432	8 st		By-Pass Seals for Hot End of Rotor Only	bfg	980.10/st	
433	8 st		Holding Strips for By-Pass Seals for Hot End of Rotor Only	bfg	248.40/st	
434	8 st		By-Pass Seals, bolts, Nuts and washers for Hot End of Rotor	bfg	127.80/st	
<u>AIR HEATER BLOWERS</u>						
435	1 ea		Diaphragm	afg	48.47/ea	
436	1 ea		Valve Disc and Stem Assembly	afg	62.85/ea	
437	1 ea		Valve Guide Washer	afg	.69/ea	
438	1 ea		Trigger Pin	afg	1.55/ea	
439	1 ea		Valve Spring	afg	3.16/ea	
440	1 ea		Valve Spring Retainer	afg	.86/ea	
441	1 ea		Valve Yoke	afg	.92/ea	
442	1 ea		Yoke Pin	afg	.63/ea	
443	1 ea		Packig Washer	afg	4.54/ea	
444	1 ea		Lock Pin Plug	afg	10.47/ea	
445	1 ea		Air Relief Valve	afg	119.49/ea	
446	2 ea		Flange Gasket	afg	65.90/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

<u>D&W</u> <u>ITEM</u> <u>NUMBER</u>	<u>QTY</u> <u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE</u> <u>PER UNIT</u> <u>OF MEASURE</u>	<u>B&W</u> <u>FOLIO</u> <u>NUMBER</u>
<u>SECONDARY AIR HEATERS</u>					
<u>AIR HEATER DRIVE, BEARINGS AND LUBE UNIT</u>					
447	1 lt	Drive Unit	cfg	72260.00/lt	
448	1 ea	Air Motor	bfg	Inc'l	
449	1 ea	Overrunning Clutch Coupling	bfg	Inc'l	
450	1 ea	Electric Motor	cfg	Inc'l	
451	1 ea	Gear Coupling	bfg	Inc'l	
452	4 ea	Solenoid Air Valve	afg	Inc'l	
453	2 ea	Rotor Guide Bearing	cfg	Inc'l	
454	1 ea	Rotor Support Bearing Runner	cfg	Inc'l	
455	1 ea	Rotor Support Bearing Shoes	cfg	Inc'l	
456	1 ea	Lube Oil Motor for Support Bearing	cfg	Inc'l	
457	1 ea	Lube Oil Motor for Guide Bearing	cfg	Inc'l	
458	1 ea	Lube Oil Pump for Support Bearing	cfg	Inc'l	
459	1 ea	Lube Oil Pump for Guide Bearing	cfg	Inc'l	
460	1 ea	Lube Oil Cooler for Guide Bearing	cfg	Inc'l	
461	4 ea	Immersion Thermostats	beg	Inc'l	
462	4 ea	Lube Oil Filter Cartridges	adg	Inc'l	
463	1 ea	Lube Oil Drive Coupling	bfg	Inc'l	
464	1 ea	Lube Oil Drive Coupling	bfg	Inc'l	
465	1 ea	Dial Thermometer	adi	Inc'l	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FOLIO NUMBER</u>
<u>MERRICK GRAVIMETRIC FEEDERS</u>						
466	8 ea		weighfeeder Belts	bfg	910.00/ea	
467	8 st		Rubber Scraper blades (Top Side and Return Side of Belt)	bfg	72.80/st	
468	4 ea		DSC-1, Complete	bfg	3802.50/ea	
469	4 ea		2 Horsepower DC Motor G.E. Tenv	bfg	2350.40/ea	
470	4 ea		SCR, Complete	bfg	2395.90/ea	
471	4 bx		.05 AMP 3 AG Fuses	bfg	2.60/bx	
			(SCR Controller, 5 Pieces)			
472	4 bx		30 AMP Fast Flow Fuses	bfg	39.00/bx	
			(SCR Drive Controller, 10 Pieces)			
473	4 ea		DSP-7 Speed Sensor, Complete	bfg	1089.40/ea	
474	4 ea		Load Cell	bfg	1040.00/ea	
475	4 ea		Reducer (For Main Drive Service)	bfg	1795.30/ea	
476	4 ea		Drag Chain Motor with Reducer Assembly	bfg	1924.00/ea	
477	4 st		Feeder Drive Sprockets	bfg	144.30/st	
478	4 ea		10 Feet Length of Feeder Drive Chain	bfg	97.60/ea	
479	4 st		Drag Chain Sprockets	bfg	742.30/st	
480	4 st		Drag Chain Link (10 Link per Set)	bfg	93.60/st	
481	4 st		Head Pulley Bearings	bfg	253.50/st	
482	4 st		Tail Pulley Take-Up Bearings	bfg	240.50/st	
483	4 st		Drag Chain Bearings	bfg	491.40/st	
484	4 ea		Discharge Plug Switch	bfg	505.70/ea	
485	4 st		Belt Tracking Switch	bfg	361.40/st	
486	24 ea		Flat Belt Idlers	bfg	910.00/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

The parts listed below are typical of the items normally recommended as spares for a burner Management Control System, and is provided solely for budgeting purposes. An allowance may be provided in the contract at the Purchasers' option, however, the specific parts cannot be finalized until after the design of the burner management system is finalized, following Contract award.

<u>B&W</u> <u>ITEM</u> <u>NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE</u> <u>PER UNIT</u> <u>OF MEASURE</u>	<u>B&W</u> <u>FOLIO</u> <u>NUMBER</u>
<u>B.T.G. INSERTS</u>						
487	2 ea		Lamp Assembly	beg	64.85/ea	
488	2 ea		Lamp Assembly	beg	64.85/ea	
489	2 ea		Lamp Assembly	beg	64.85/ea	
490	2 ea		Lamp Assembly	beg	56.20/ea	
491	2 ea		Switch	beg	92.95/ea	
492	2 ea		Switch	beg	14.15/ea	
493	2 ea		Meter	beg	69.75/ea	
494	2 ea		Switch Assembly	beg	66.50/ea	
495	2 ea		Switch Assembly	beg	66.50/ea	
496	2 ea		Switch Assembly	beg	54.35/ea	
497	2 ea		Switch Assembly	beg	54.35/ea	
498	2 ea		Connector	beg	11.75/ea	
499	200 ea		Connector Pins	beg	.30/ea	
500	2 ea		Digital Timing	beg	424.75/ea	
501	2 ea		Transformer	beg	22.80/ea	
502	200 ea		Lamp	beg	1.30/ea	
503	100 ea		Lamp	beg	1.30/ea	
<u>LOCAL CONTROL STATION</u>						
504	6 ea		Light	beg	47.05/ea	
505	4 ea		Lens	beg	6.10/ea	
506	2 ea		Lens	beg	6.10/ea	
507	2 ea		Lens	beg	6.10/ea	
508	2 ea		Lens	beg	6.10/ea	
509	2 ea		Switch	beg	45.70/ea	
510	2 ea		Switch	beg	26.90/ea	
511	2 ea		Switch	beg	17.45/ea	
512	100 ea		Lamp	beg	.95/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>MASTER LOGIC CABINET</u>						
513	2	ea	Blower	beg	351.80/ea	
514	2	ea	Power Supply	bfg	1526.55/ea	
515	2	ea	Power Supply	bfg	2649.80/ea	
516	2	ea	Power Supply	bfg	2788.50/ea	
517	2	ea	Smoke Detector	beg	167.35/ea	
518	4	ea	Relay	beg	37.60/ea	
519	2	ea	Relay	beg	164.45/ea	
520	2	ea	Relay	beg	73.00/ea	
521	20	ea	Diode	beg	.30/ea	
522	20	ea	Varistor	beg	4.00/ea	
523	2	ea	Relay	beg	141.50/ea	
524	2	ea	Relay	beg	33.00/ea	
525	2	ea	Relay	beg	36.60/ea	
526	2	ea	Relay	beg	44.00/ea	
527	10	ea	Diode	beg	24.90/ea	
528	10	ea	Diode	beg	4.60/ea	
529	20	ea	Fuse, Buss	bfg	1.35/ea	
530	20	ea	Fuse, Buss	bfg	3.40/ea	
531	20	ea	Fuse, Buss	bfg	2.75/ea	
532	20	ea	Fuse, Buss	bfg	3.45/ea	
533	20	ea	Resistor, 10K ohm, 7w	beg	2.75/ea	
534	2	ea	Relay, Electros witch	beg	1053.95/ea	
535	2	ea	Coil for Electros witch Relay	beg	90.10/ea	
536	10	ea	Fuse, Buss	bfg	3.45/ea	
<u>MASTER AND MILL LOGIC DRAWER ASSEMBLIES</u>						
537	2	ea	Connector	beg	9.10/ea	
538	6	ea	Connector	beg	13.15/ea	
539	20	ea	Polarizing Pins	beg	.30/ea	
540	2	ea	Diode	beg	6.00/ea	
541	2	ea	Switch	beg	21.75/ea	
542	2	ea	Switch	beg	6.40/ea	
543	2	ea	Switch	beg	37.60/ea	
544	4	ea	Lampholder	beg	2.90/ea	
545	4	ea	Lampholder	beg	2.80/ea	
546	10	ea	Lamp	beg	4.15/ea	
547	10	ea	Lamp	beg	4.50/ea	
548	10	ea	Resistor, 100 ohm, 1/2w	beg	.10/ea	
549	10	ea	Resistor, 2.2K ohm, 2w	beg	.25/ea	
550	10	ea	Resistor, 1K ohm, 1/2w	beg	.10/ea	

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>MASTER AND MILL LOGIC</u>					
<u>DRAWER ASSEMBLIES (CONTINUED)</u>					
551	10 ea	Capacitor, 5.6 Mf	beg	1.60/ea	
552	10 ea	Fuse, GBB-10	bfg	3.40/ea	
553	2 ea	Switch	beg	27.90/ea	
554	20 ea	Resistor, 220 ohm, 1/2W	beg	.10/ea	
555	20 ea	Resistor, 2.7K ohm, 1W	beg	.15/ea	
<u>PRINTED CIRCUIT CARDS</u>					
556	2 ea	Printed Circuit Card	beg	266.00/ea	
557	2 ea	Printed Circuit Card	beg	197.35/ea	
558	2 ea	Printed Circuit Card	beg	293.15/ea	
559	2 ea	Printed Circuit Card	beg	115.85/ea	
560	2 ea	Printed Circuit Card	beg	100.10/ea	
561	2 ea	Printed Circuit Card	beg	125.85/ea	
562	2 ea	Printed Circuit Card	beg	111.55/ea	
563	2 ea	Printed Circuit Card	beg	215.95/ea	
564	2 ea	Printed Circuit Card	beg	85.80/ea	
565	2 ea	Printed Circuit Card	beg	91.55/ea	
566	2 ea	Printed Circuit Card	beg	67.25/ea	
567	2 ea	Printed Circuit Card	beg	92.95/ea	
568	2 ea	Printed Circuit Card	beg	108.70/ea	
569	2 ea	Printed Circuit Card	beg	165.90/ea	
570	2 ea	Printed Circuit Card	beg	114.40/ea	
571	2 ea	Printed Circuit Card	beg	124.45/ea	
572	2 ea	Printed Circuit Card	beg	195.95/ea	
573	2 ea	Printed Circuit Card	beg	121.55/ea	
574	2 ea	Printed Circuit Card	beg	163.05/ea	
575	2 ea	Printed Circuit Card	beg	168.75/ea	
576	2 ea	Printed Circuit Card	beg	91.55/ea	
577	2 ea	Printed Circuit Card	beg	218.80/ea	
578	2 ea	Printed Circuit Card	beg	124.45/ea	
579	2 ea	Printed Circuit Card	beg	270.30/ea	
580	2 ea	Printed Circuit Card	beg	105.65/ea	
581	2 ea	Printed Circuit Card	beg	114.40/ea	
582	2 ea	Printed Circuit Card	beg	90.10/ea	
583	2 ea	Printed Circuit Card	beg	111.55/ea	
584	2 ea	Printed Circuit Card	beg	104.40/ea	
585	2 ea	Printed Circuit Card	beg	157.30/ea	
586	2 ea	Printed Circuit Card	beg	214.50/ea	
587	2 ea	Printed Circuit Card	beg	211.65/ea	

TABLE A
SPARE PARTS

B&W ITEM NUMBER	QTY	U/M	DESCRIPTION	NOTE	PRICE PER UNIT OF MEASURE	B&W FOLIO NUMBER
<u>PRINTED CIRCUIT CARDS (CONTINUED)</u>						
586	2 ea		Printed Circuit Card	beg	92.95/ea	
589	2 ea		Logic Probe	beg	214.50/ea	
590	2 ea		Card Tester	beg	6435.00/ea	
<u>CABLE ASSEMBLIES</u>						
591	2 ea		Cable Connector	beg	27.35/ea	
592	2 ea		Adapter Assembly	beg	35.90/ea	
593	2 ea		Connector	beg	19.30/ea	
594	2 ea		Backshell	beg	20.70/ea	
595	2 ea		Connector	beg	22.10/ea	
<u>BLOWER LOGIC CABINET ASSEMBLY</u>						
596	2 ea		Starter	beg	1154.05/ea	
597	2 ea		Light	beg	51.80/ea	
598	2 ea		Light	beg	51.80/ea	
599	2 ea		Selector Switch	beg	49.05/ea	
600	2 ea		Transformer	beg	100.45/ea	
<u>PRESSURE SWITCHES</u>						
601	2 ea		Pressure Switch	afg	343.20/ea	
602	2 ea		Pressure Switch	afg	343.20/ea	
603	2 ea		Pressure Switch	afg	266.00/ea	
604	2 ea		Pressure Switch	afg	126.70/ea	
605	2 ea		Pressure Switch	afg	84.40/ea	
<u>IDD-II DETECTOR ASSEMBLY</u>						
606	46 ea		IDD-II Detector Head	bfg	357.50/ea	
<u>OIL VALVE ASSEMBLY - SACHO</u>						
607	2 ea		Valve	bdg	246.70/ea	
608	2 ea		Valve	bdg	254.50/ea	
609	2 ea		Cylinder	bdg	780.80/ea	
610	4 ea		Repair Kit, Rod Seal	bdg	60.10/ea	
611	4 ea		Repair Kit, Piston Seal	bdg	77.25/ea	
612	2 ea		Limit Switch	bdg	110.15/ea	
613	20 ea		Spiral Pin	bdg	.10/ea	
614	20 ea		Retaining Ring	bdg	.25/ea	
615	2 ea		Orifice Union	bdg	46.50/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

TABLE A
SPARE PARTS

<u>B&W ITEM NUMBER</u>	<u>QTY</u>	<u>U/M</u>	<u>DESCRIPTION</u>	<u>NOTE</u>	<u>PRICE PER UNIT OF MEASURE</u>	<u>B&W FCLIC NUMBER</u>
			<u>TRIP VALVE ASSEMBLY</u>			
616	2 ea		Regulator, Fisher	beg	81.75/ea	
617	2 ea		Limit Switch	beg	117.30/ea	
618	2 ea		Solenoid Valve	beg	171.60/ea	
619	2 ea		Muffler, P.H. OR-25 Quick Exhaust	bdg	18.05/ea	
			<u>OIL RECIRCULATION VALVE</u>			
620	2 ea		Solenoid Valve 4 Way, 1/4 Inch	beg	85.10/ea	

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

IN WITNESS WHEREOF, the parties hereto have executed
this agreement under date of

INTERMOUNTAIN POWER AGENCY OF
THE STATE OF UTAH

by

BOARD OF INTERMOUNTAIN POWER AGENCY
OF THE STATE OF UTAH

Approved
LZ Lumb

By *Joseph L. Lumb*
Title *Executive Officer*
Date *9/17/82*

EAPCOCK and WILCOX

(SEAL)

By *T. L. Bower*
T. L. Bower, Manager, Legal Department
Fossil Power Generation Division
Title _____
Date *Aug 11, 1982*

Accepted in accordance with the accompanying
letter dated *Aug 14, 1982*

RECEIVED

File: 62,3401

NOV 1 1982

IPP

CONFORMED

CONTRACT NO. 2010N

BOILER UNITS FOR

INTERMOUNTAIN GENERATING STATION

UNITS 1 THROUGH 4

Ben Brown
5 Apr 83

Effective Date: May 29, 1981

Owner:

Intermountain Power Agency

Project Manager:

Department of Water and Power
City of Los Angeles

Contractor:

Babcock & Wilcox

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

Temp. Elect. Forest —

Page ER-10
(f1-152)

Misc.

4/20/83 Progress Reports - F2-14

deleting
example
use

1 Cold Points

G1-3 on P.A. fans

Weld Radiograph requirements
per ASME Code

① not less than 10% of 3" dia & less

added 40 ENG'r → CO-?

@ unit price -
unless defect → % Contractor

Contract \Rightarrow 4 units
rev. to 2

Misc.

11

Pg.

4/20/83

hydro

- procedure

water source - F2-14

chem. source

Chem. Analysis

charts

equipment

AI

-61-3-8

hold point

chart approval.

acid clean

F2-14

per D.C.
manual

Waste disposal

% IPA \Rightarrow

hazardous

metallc

combustible

paper products

F2-13

Fire Protection duties &

training

F2-13

by who - ? -

Receiving - report to engineer F2-15

witness test requirements
Section 6

page 61-3

* Line 234 PB of 61-6 ⇒ paint

Welder test qualifications—
61-6

prequal. per ADME
Copies of weldr. quals. to engineer

⇒ time limit — like BPC—

IPP

BPC Job # 14132

Contract # 62.3401

Boiler

Supply —

Erection —

to Contractor Babcock & Wilcox

Owner IPA

Project Manager ⇒ Dept. of Water & Power
City of Los Angeles, Calif.

4/16/93
PUN 65
OIT
B.H.B.

Contract Notes

① Section C ⇒

a) Options taken
open

b) Spare Parts

c) Manuals IPA library
BPC
B.#V.

d) Erection Price Change Order #1 ⇒ 24,185.60

page 2 of _____
4/16/83, PVN63, B.H.B.

e) Special tools - page C-20

f) Erection Options - pages C-15 thru C-21

g) gauranty items \Rightarrow performance
pg. C-22

II Part D, \Rightarrow Contract documents

? \Leftarrow a) engin \Rightarrow CO-ord
or B & V

b) engineer definition of Part E,
General Conditions

III Part E, - General Conditions

a) pg. E1-2

IP 1.11 \Rightarrow Disputed instruction
Procedure

I.C. Claims & extensions.

b) invoices \Rightarrow page E1-15

c) Acceptance \Rightarrow page E1-20

d) Subcontractor responsibility \Rightarrow page E1-21

Page 3 of —

Security per E2-12 line 409
⇒ Contractors responsibility

3 day ⇒ damage, loss or injury.
pg E2-12, line 426

Contractors Presence E2-17
line 604

Stop work E2-19 line 667

Schedule submit E2-19 line 681

Additional Comp. E2-20

Disputes for pymt of work E-2-20

Cleanup E-2-20

Overtime E-2-21 line 760

B&W

Max. Action Items

literal interpretation =

Contract effective date -

referenced i.e. drugs. F1-7

Security -

Safety -

Q.C. -

Codes -

AI -

Permits -

Water - E2-18 line 637

Sanitary - E-2-18 - line 637

detailed schedule - E-2-19 - 681

Drug list per F1-3 line 150

witness points list & letter

Hold points " "

Spec. 2010 N
Special Conditions

Note:
Section F1
requires F2
made.

4/19/83 ① Service engineering requirements

Replaced by
F2-7
1.3.16

{ Page F1-18
a) systems
b) furnish instructions
Installation, start up, initial ops.

② future engineering - pg. F1-19

③ Operate Unsat. equipment - pg. F1-19

④ Instruction Manuals - pg. F1-19

★ ★ ⑤ Contractor's Erection Information Packages
pg. F1-20
18 mo. prior to 1st delivery.
subject to approval ⇒ fine 8/7

⑥ Equipment Progress Report ⇒ status ⇒ pg. F1-21

Spec 2010 NL
 Part F-2
 Supplementary Special Instructions

4/19/83

① Modifications to Section F1
 as follows -

② Erection Schedule ⇒ Unit 1
 Unit 1 Drum 10-1-83
 hydro 9-1-85
 etc.
 Erection Complete U-1 3-1-86 U-2 3-1-87

★★ ③ IPA to Contractor ⇒ CPM & PCLD
 pg. F2-2 line 74

And required input per
 Acknowledgments i.e. PCCS (F2-3, 108), etc.

★★ ④ F2-4 engineer ⇒ PCLD, PCCS, ACCS.
 Contractor ⇒ CCSD, CCS, & ACCSD
 monthly

★★ ⑤ Schedules Objectives Meeting F2-5
 ★★ ⑥ Commodity 5 curves - (216) F2-5
 W forms to contractor -

Spec. 2010 N
Part F-2
Sup. Special Instructions

4/19/83 ⑥ Co-ordination outline —
⇒ priority
extension
extra compensation

⑦ Rotating Parts - balancing -

⑧ list of subcontractors
⇒ written approval vs. my ⇒
F2-8 line 320 mtg ⇒
voluntary
for evaluate.

⑨ Temporary Works & Construction Facilities
F2-8 & 9

line 365 ⑩ Change shack - got final resolution
F2-9

⑪ Engineer — Specs. for temp. or
approval of & location of trailers.

(12) Utilities, phones, air, Power
per F2-10

⇒ buried cable per
IPA cable marking tape

4/20/83

(13) Water F2-11
IPA - to designated
hydrant by engineer

Drinking water - IPA provides
to contractors facilities

(14) Cleanup F2-12
E2- ~~See~~ Article 13

(15) Fire protection F2-12

(16) Welding facilities F2-14

(17) Other services by IPA F2-14

(18) Material Recv, handle, & storage F2-15

4/20/83 (19) Scaffolding F2-16

(20) Permanent IPA \Rightarrow Early on erect
temporaries \Rightarrow % Contractor

F2-17

(21) IPA defines larger blr.
installation \Rightarrow

considered ready for
the start of erection
when walkways & stairways
are in place from ground
to upper levels & rigging is
ready -

Contractor \Rightarrow "leave out" steel

\Rightarrow erector deduct
w IPA install per
1.3 of E2

Contract No. 2010N
file 62.3401

Part G - Detailed Specs. -

① Boiler ASME & Pressure Vsl. Code
& shall be so stamped

Pf. 61-1

② Piping & valves per ^②ANSI B31.1
① Utah Code
Pf. 61-1

Pf. 61-2 a) coal hdlg.; piping,
burners, furnace & controls
Code

b) struct. steel, etc. AISC -

Code conflicts \Rightarrow resolve by
project director via
written report.

Pg. 61-2

c) bailout

d) furnace plan

& other technical definitions

Radiographs 61-3

Witness tests

61-3

line 102 \Rightarrow All tests under
this article shall
be witness tests

\Rightarrow tests required under Boiler
& Vessel Code

& per contract

a) shear wave
ultrasonic tests

ASME Power Boiler Code

Section I, Part PW-52

10" O.D. & larger to
drums & headers

b) tests on all valves 3" or larger
in accordance with ANSI B16.34,
as last revised.

c) PA fan rotor fit up prior to welding

d) mag. particle of completed
PA fan rotor - per ASTM E 109

e) Radiographic of shop pressure welds
beyond contractor Q.C. - when
requested by the Engineer

f) Radiographic requirements 61-3, 123

g) ultrasonic all pressure tubes 61-4, 136

page 61-4

- h) wall tubes \Rightarrow fluoroscope
(line 142) if not available \Rightarrow
monitor at least 5%
of each welders work -
 \Rightarrow acceptance reject \Rightarrow additional
controls shall be initiated.
- i) mill tests (line 148)
test in place at
request of the engineer
- j) Operating tests TP 4
Line 158
including connection curves
of test data.
- k) Motor tests & Inspection TP 5
61-5
line 176
- l) BMC (Burner Mgt. Control) TP 6
 \Rightarrow factory tests 61-5
Acceptance tests line 193

m) information to be furnished
by the contractor —
& Agreements to Section 3
of PTC 4.1

⇒ all remaining
shall be done per
Agreement - previously reached.

File 02.3401
Contract 201014
IPA - IAP

4/22/83 Section G2 \Rightarrow Contract Items

Section G3 \Rightarrow Detailed Specs.
Capacities -
flow ~~6,100,000~~
(superheat) 6,100,000 #/hr
2515 psig
@ 1005°F

Reheat inlet
5,000,000 #/hr.
620°F
539 psig

Reheat outlet
1005°F } $P = 639$
Flow to econ \Rightarrow 543°F
Desuph. spray \Rightarrow 340°F
Air temp to fans \Rightarrow 60°F

63-4
(153) Drivable pressure pants - within 2 hrs
Seamless tubing -

Section 63 Detailed Requirements

Design Pressure Pg. 63-14

internal positive to ^{not less than} 130%
of the pressure loss from
the APT coils inlet to the
furnace at Max. Capacity

⇒

And

? { to withstand an internal
negative pressure ⇒
the absolute value of
the designed internal
neg. press. shall be not
less than 130% of the
sum of 21" of water & the
P loss from the furnace
to the Air heater gas out let.

Furnace - elements min ⇒ 18" spacing - line (266) ⁶³⁻¹⁴
3" ctr. min on convection tubes ⇒ 63-17, (377)



1/2

To Don Campbell / Wally West
Subject: STEAM GENERATOR CONTRAT 62.3401

AS YOU ARE AWARE, B.P.C. HAS RELIEVED
THE CONFORMED 62.3401 CONTRACT, AS YOU
ARE FURTHER AWARE THE C.M. IS ONLY TO
RECEIVE BILLS OF LADING. THIS FUNCTION
CAN BE DONE WITHIN THE FIELD MATERIAL
MANAGERS GROUP. WITH LAST FRIDAYS 12:30
PM COORDINATORS MEETING FIRMLY IN MY MIND,
THE CURRENT PHILOSOPHY OF FOLLOW THE CONTRACT
OR CHANGE IT, I SUBMIT THAT THIS CONFORMED
CONTRACT (a) DOES NOT REQUIRE INPUT FROM
THE CONSTRUCTION COORDINATION GROUP (b) DOES
NOT REQUIRE INPUT FROM COST / SCHEDULING.
THEREFORE NEITHER A B.P.C. BOILER
NOT A B.P.C. SCHEDULE ARE REQUIRED *

AS A ALTERNATIVE TO THE ABOVE THE

WHOLE CONTRACT NEED TO BE REWROTE TO

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INCLUDE B.F.G. AS THE CONSTRUCTION MANAGER.
THIS SEEMS TO BE THE MOST PRACTICAL THING
TO DO, HOWEVER ON THIS PROJECT THIS
PRESENTS MAJOR OBSTACLE (LADWP).

WE HAVE FIVE MONTHS BEFORE BFW
MOBILIZES! THE REQUIRED CHANGES
HAVE TO BE INITIATED AT A HIGHER
LEVEL THAN THE CONTRACT COORDINATOR

YOURS VERY TRULY

A handwritten signature, likely of John, written in cursive script.

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All equipment installed on IPA-constructed foundations shall be grouted.	29
The Contractor shall perform air leakage tests and point-to-point pneumatical and electrical continuity checks of all controls.	31 32
2. <u>Additional Equipment Furnished by the Contractor:</u> All equipment and incidental material necessary to erect the Boiler Units shall be furnished.	34 35
For tube temperature monitoring, the Contractor shall furnish and attach thermocouples, furnish waterproof junction boxes located on one side of the Eciler Units, and extend the thermocouple leads to the junction boxes. Terminal coupler shall be shielded and marked according to size, type and location. Junction boxes shall be equipped with Western Electric Company Type 30 terminal strips with Type 102 adapters.	37 38 39 40 41
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(b) All control valves between the Contractor's equipment and equipment furnished by the IPA.	50

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GENERAL CONDITIONS 17

1. Definitions: The following terms, when used in these specifications, shall be understood to have the following respective meanings: 22 23

1.1 IPA: The Intermountain Power Agency, a political subdivision of the State of Utah organized and existing under the Interlocal Co-operation Act, Title 11, Chapter 13, Utah Code Annotated 1953, as amended. 26 27

1.2 Project Manager: The Project Manager for the Intermountain Power Project (IPP) which shall be the Department of Water and Power of the City of Los Angeles who shall act as agent for the IPA in administration of the contract. 30 31

1.3 Project Director: The duly authorized representative of the Project Manager. 34

1.4 Engineer: The Project Director or his assistants and inspectors properly authorized and limited by the particular duties entrusted to them. 37 38

1.5 Bidder: The person, firm, or corporation submitting a bid or proposal under these specifications or any part thereof. 41 42

1.6 Contractor: The person, firm, or corporation executing the contract with the IPA for the work required, and the representatives or agents of said party appointed to act for said party in the performance of the work. 45 46 47

1.7 Subcontractor: A person, firm, or corporation other than the Contractor who supplies labor, materials, or equipment on a portion of the work. 50 51

1.8 Drawings or Plans: Collectively all of the drawings or plans attached to, made a part of, or referred to in these specifications, and also such drawings or plans as may be furnished by the Contractor and approved by the Engineer. 54 55 56

1.9 Ton: The short ton of two thousand pounds. 59

1.10 Miscellaneous: Whenever in the specifications or upon the drawings, the words "Directed", "Required", "Permitted", "Ordered", "Designated", "Prescribed", or words of like import are used, it shall be understood that the direction, requirement, permission, order, designation, or prescription of 62 63 64 65

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the Engineer is intended; and similarly the words "Approved",	66
"Acceptable", "Satisfactory", or words of like import, shall	
mean approved by or acceptable to, or satisfactory to the	67
Engineer, unless otherwise expressly stated.	
1.11 <u>Disputed Instruction Procedure:</u> In each case	70
within the Specifications the words "directed by", "authorized,"	
"approved" and words of like imports, followed by the words "his	71
decision shall be final" or "conclusive" wherein the Contractor	
is not in agreement, shall be subject to the following:	72
(a) The Contractor shall carry out the	74
instructions, accept payment, or otherwise comply with the	75
Engineer's order without prejudice to any claim for additional	
time or compensation.	
(b) On claims under \$250,000 or less than 30 days'	77
extension of time, the Contractor shall file a request, in	78
writing, addressed to the Engineer for hearing within 15	
calendar days of the final instruction, as indicated in the	79
notice section of the specifications.	
The Contractor shall state the basic disagreement	81
with the Engineer's findings and the relief sought under the	82
contract. The Contractor shall submit any additional facts to	83
substantiate this claim and identify those individuals in the	84
Project's work force who may provide additional information to	
verify the claim.	
(c) The Engineer will notify the Contractor,	86
within 15 calendar days after receipt of such request, of a	87
meeting time to discuss the claim.	
(d) In the event further discussion does not	89
resolve the issue, the Engineer will arrange a meeting with the	90
Project Director to present the claim. The Project Director	91
will render his opinion, in writing, within 30 days of receiving	
the Contractor's final arguments under the claim. In the event	93
the Project Director finds the Contractor has not substantiated	
the claim, the Contractor may pursue the claim by whatever means	94
that are legally available to the Contractor to determine	
whether the action of the Project Director was arbitrary,	95
capricious, or not in accordance with the contract.	
(e) On claims over \$250,000 or greater than 30	97
days extension of time, the Contractor shall follow steps a	98
through d above and request, in writing through the Project	
Director, a hearing before the Intermountain Power Project	99
Coordinating Committee. The Project Director will arrange a	100

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hearing before the Intermountain Power Project Coordinating Committee at their next scheduled meeting. The Intermountain Power Project Coordinating Committee will give the Contractor written notification of its findings within 30 calendar days of such meeting. In the event the Intermountain Power Project Coordinating Committee finds the Contractor has not substantiated the claim, the Contractor may pursue the claim by whatever means are legally available to the Contractor to determine whether the action of the Coordinating Committee was arbitrary, capricious, or not in accordance with the contract.

2. Contractor's Legal Address: The address given in the proposal shall be considered the legal address of the Contractor. It may be changed by written notice to the Project Director. The delivery to such address, or the depositing in the United States Mail of any communication registered and postage prepaid addressed to the Contractor at such address, shall constitute a legal service thereof. Nothing contained herein shall be deemed to preclude the service of any notice or other communication upon the Contractor personally.

3. Assignment of Contract Forbidden: The Contractor shall not assign, transfer, convey, sublet, or otherwise dispose of this contract, or of his right, title, or interest in or to the same or any part thereof, ~~without the written consent of the Project Director~~, and he shall not assign, by power of attorney or otherwise, any of the moneys to become due and payable or moneys due and payable under the contract, unless by and with the like consent signified in like manner. If the Contractor shall, without such previous written consent, assign, transfer, convey, sublet, or otherwise dispose of the contract, or of his right, title, or interest therein, or of any of the moneys to become due, or due under the contract, to any other person, company, or other corporation, the contract may at the option of the Project Director and the IPA be terminated, revoked, and annulled, and the Project Manager and the IPA shall thereupon be relieved and discharged from any and all liability and obligations growing out of the same to the Contractor, and to his assignee or transferee. No right under the contract, nor any right to any money to become due or due hereunder, shall be asserted against the Project Manager or the IPA in law or equity by reason of any so-called assignment of contract, or any part thereof, or by reason of the assignment of any moneys to become due hereunder, unless authorized as aforesaid by the written consent of the Project Director.

The proscription of this clause shall apply mutually to IPA and the Contractor. Further, a corporate or municipal reorganization, merger or acquisition of assets shall not be

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considered an assignment under this clause unless the successor 139
entity substantially dilutes the financial status of the 140
Contractor or significantly impacts on the Contractor's key
personnel.

4. Extensions of Time for Contractor and for IPA: 142

"All work shall be completed within the periods
specified in the contract; provided, however, that time for the
completion of the work will be extended by a period equivalent
to any delay"
authorized by the Project Director, or delays caused by the
Project Manager or other delays in delivery due to unforeseeable 146
causes beyond the control of the Contractor, including, but not 147
restricted to, acts of God or of the public enemy, war, 148
insurrection, mob violence, strikes, lockouts, fires, floods,
epidemics, quarantine restrictions, freight embargoes, acts of 149
another contractor in the performance of a contract with the 150
IPA, unavoidable casualty, abnormal amount of inclement weather, 151
want of necessary material, acts of the United States of 152
America, including but not restricted to, any preference, 153
priority or allocation order, or delays of subcontractors due to 154
any of such causes, unless the Engineer shall determine that the
supplies or service to be furnished by the subcontractor were 155
obtainable from other sources in sufficient time and at 156
reasonable costs to permit the Contractor to meet the required
delivery schedule, to the extent only that this contract is 157
affected, if the Contractor shall within 30 days from the 158
beginning of any such delay notify the Engineer in writing of
the causes of the delay, and also upon the ending of any such 159
delay notify the Engineer in writing of the ending thereof and 160
the extension of time claimed, unless the Engineer shall grant a 161
further period of time for such notices prior to the date of
final settlement of the contract; whereupon the Engineer shall 162
ascertain the facts and the extent of the delay and the time 163
required to reestablish normal working conditions and extend the
time for delivery when in his judgment the findings of fact 164
justify such an extension, and his findings of fact thereon
shall be final and conclusive.

The Contractor in submitting any proposal for extra 166
work, or in consenting to any revision of design or plans 167
pursuant to Article 11 of this Division, shall therewith notify
the Engineer in writing of any extension of time required, and 168
failure of the Contractor to give such written notice shall
constitute conclusive evidence that such extra work or revisions 169
will entail no delay and that no extension of time will be
required.

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The Contractor shall revise, with the approval of the Engineer, the payment schedules required in Article 19 of this Division when extension of time is granted by the Engineer. 171 172

If the Project Manager or the IPA is delayed in the performance of any act, or in furnishing any material or equipment to be furnished by them, and such delay shall be either authorized by the Contractor or caused by delays due to unforeseeable causes beyond the control of the Project Manager or the IPA, including, but not restricted to, acts of God or of the public enemy, war, insurrection, mob violence, strikes, lockouts, fires, floods, epidemics, quarantine restrictions, freight embargoes, unavoidable casualty, abnormal amount of inclement weather, want of necessary material, acts of the United States of America, including, but not restricted to, any preference, priority or allocation order, or delays of other contractors of the IPA due to any of such causes, to the extent only that this contract is affected, then and in that event the IPA or the Project Manager shall not be responsible in any manner or to any extent for damage directly or indirectly suffered by the Contractor by such delay, except for extensions of time as herein provided. 174 175 176 177 178 179 181 182 183 184 185 186

5. Patents: The Contractor shall fully indemnify the IPA and the Project Manager against any and all liability whatsoever by reason of any alleged infringement of any patent on any article, process, method, or application used by him in the construction of the work, or by reason of any use by the Project Manager or the IPA of any article or material furnished under this contract. 189 190 191 192

6. Specified Materials or Equivalent: Whenever in the specifications any particular material or process is indicated or specified by a patent or proprietary name, or by a trade or brand name, or by the name of a manufacturer, such wording shall be deemed to be used for the purpose of facilitating description of the material or process required, shall fix the standard of quality required, and shall be deemed to be followed by the words "or equivalent". The Contractor, by written notice, may offer any material, or process, which shall be the equivalent of that so indicated or specified. Determination as to whether a material or process is equivalent to that specified shall be within the sole discretion of the Engineer. 195 196 197 198 199 200 201 202 203

7. Materials and Workmanship: All materials and work shall comply with these specifications. All materials and equipment furnished shall be new and unused, but such requirement shall not preclude the use of recycled materials in 206 207 208

DIVISION E1

the manufacturing processes, provided that the Detailed Specifications do not prohibit the use of such materials and provided further that all such materials comply with these specifications. All work shall be done in a thorough, workmanlike manner, by mechanics skilled in their various trades. Materials or workmanship not definitely specified, but incidental to and necessary for the work, shall conform to the best commercial practice for the type of work in question.

8. Inspection: 215

8.1 Inspection and Rejection: All materials or equipment furnished and delivered under the contract shall be subject to inspection by the Engineer. If any items or articles are found not to meet the requirements of the specifications, the lot, or any faulty portion thereof, may be rejected. Before offering a lot for inspection, the Contractor shall eliminate any items which, in his opinion, are defective or do not meet the requirements of the specifications. The fact that the materials or equipment have been successfully inspected, tested and accepted by the Engineer shall not relieve the Contractor of responsibility in the case of later discovery of flaws or defects through the guarantee period.

8.2 Inspection at IPA's Receiving Points: Materials or equipment purchased under the contract will be inspected at the IPA's specified receiving points and there accepted or rejected. Inspection will include the necessary testing for determining compliance with the specifications. All expense of initial acceptance tests will be borne by the IPA. The expense of subsequent tests due to failure of materials or equipment first offered will be charged against the Contractor.

8.3 Inspection at Contractor's Mill, Factory, Yard or Warehouse: When the Detailed Specifications provide for inspection at the Contractor's mill, factory, yard, or warehouse, the conditions shall be as follows:

8.3.1 Access: The Engineer shall have the right to inspect the Contractor's and subcontractor's work in the course of manufacture and require such tests from time to time as he may deem advisable. The Contractor shall furnish, at his own expense, reasonable facilities including tools and instruments for so doing and for obtaining such information as the Engineer desires respecting the progress and manner of the work and the character of the materials used. Such tests shall be conducted at reasonable times during normal working hours and the cost of such tests shall be at IPA's expense if no rejectable defects

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are revealed. Repair of defects so revealed and testing of repairs shall be at the Contractor's expense.	250
8.3.2 <u>Witness Tests</u> : Mill or factory witness tests, if called for in the Detailed Specifications, shall be made under the supervision and approval of the Engineer. The Contractor shall bear all expense of such tests except the compensation and expense of the Engineer.	253 254 255 256
8.3.3 <u>Notification</u> : Unless otherwise provided in the Detailed Specifications, the Contractor shall notify the Chief Quality Assurance Engineer, P.O. Box 111, Los Angeles, California 90051, Telephone Number (213) 481-5535, not less than 5 days in advance of the day when:	259 260 261
(a) Manufacture starts.	263
(b) The product is ready for testing.	265
(c) The finished product is ready for inspection.	267
Should the Chief Quality Assurance Engineer elect to waive his right to inspection or to witnessing tests and accept certified test reports instead, he will promptly inform the Contractor so that production will not be delayed.	269 270 271
8.3.4 <u>Certified Test Reports</u> : If required in the Detailed Specifications or at the option of the Engineer in lieu of witness tests, the Contractor shall furnish certified mill or factory test reports in the quantities required and delivered as instructed by the Engineer.	274 275 276
8.3.5 <u>Release</u> : Materials or equipment to be inspected by the Engineer at the Contractor's mill, factory, yard, or warehouse shall not be released for shipment until they have satisfactorily passed the Engineer's inspection. Materials or equipment shipped prior to release may be rejected.	279 280 281
8.4 <u>Quality Assurance</u> :	283
8.4.1 <u>General</u> : As a means of assuring that the performance of the work fulfills the requirements of these specifications, the Contractor and his subcontractors shall establish and implement a quality assurance program for all of the work.	286 287 288
8.4.2 <u>Inspections and Audits</u> : The Contractor's work and related records shall be subject to inspection and audit by the Engineer to assure compliance with applicable requirements.	291 292

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Upon detection of a noncompliance with the requirements of these specifications or the accepted quality assurance manual when a manual is required, corrective action may be requested by the Engineer. The Contractor shall correct in a timely manner all such deficiencies so identified. The Contractor shall allow the Engineer to review the Contractor's internal and vendor audit reports.

8.4.3 Quality Assurance Program: The quality assurance program shall be capable of providing assurance that design, purchasing, manufacturing, shipping, storage, testing, and examination of all equipment, materials, and services will comply with the requirements of these specifications.

8.4.4 Quality Assurance Manual: The quality assurance program shall be documented in a quality assurance manual. The form and format of the quality assurance manual shall be at the discretion of the Contractor and his subcontractors. The content of the quality assurance manual may be in the form of written descriptions of quality assurance policies, procedures, methods, instructions, exhibits, or other quality assurance method descriptions. Controlled copies of the quality assurance manual shall be submitted to the Engineer and made available for the use of the Engineer at each manufacturing facility. The controlled copies of the quality assurance manual shall be kept current by submittal of revisions as applicable throughout the life of this contract.

The Contractor's quality assurance manual shall describe the authority and responsibility of the persons in charge of the quality assurance program and inspection activities. The quality assurance manual shall also include, as a minimum, control procedures or methods to assure the following:

(a) Design documents, drawings, specifications, quality assurance procedures, records, inspection procedures, and purchase documents that are maintained current, accurate, and under control.

(b) Purchased materials, equipment, and services that comply with the requirements of these specifications.

(c) Receipt of inspection, in-process inspection, examination, testing, and checkout reports.

(d) Adequate inspection of subcontracted work.

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(e) The quality of welding, heat treating, hot forming, nondestructive testing, and other special processes. 330
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(f) Proper methods that are employed for the qualification of personnel who are performing welding and nondestructive examinations. 333
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(g) Proper documentation, control, and disposition of materials that do not comply with these specifications. 336
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8.4.5 Inspection and Test Outline: Prior to starting any fabrication, the Contractor shall submit a detailed inspection and test outline for the work. The inspection and test outline shall list the major components of the work, subassemblies, final assemblies, and each inspection and testing point for each of the items identified. The outline shall include the items to be inspected and tested by the Contractor's subcontractors at the subcontractor's facilities. The Contractor shall inspect the work of subcontractors to the extent necessary to assure that proper materials and equipment are furnished and that fabrication is accomplished in accordance with these specifications. 340
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8.4.6 Storage Procedure Manual: The Contractor shall submit a standard storage procedure manual describing the procedures and/or requirements used to assure no damage to equipment and material. 351
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8.4.7 Nonconformance Reports: The Engineer shall have access to all nonconformance reports and the Contractor shall provide to the Engineer a copy of those nonconformance reports requested by the Engineer. Disposition of nonconformances in which the acceptance and use of an item could contribute to less than desired appearance, required performance, long-term reliability, or interchangeability shall be subject to approval by the Engineer. 355
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8.5 Inspection of Field Work: 40

8.5.1 All material and field work done shall be subject to inspection by the Engineer. Such inspection shall not relieve the Contractor of the responsibility of furnishing the best labor and materials in strict accordance with the specifications. Any material or field work approved and later found to be defective through the guarantee period shall be repaired or replaced without cost to the IPA. The Contractor shall ask for the Engineer's approval only after his own thorough inspection and after he is satisfied he has met all requirements of the specifications. 42
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~~8.5.2~~ 8.5.2 The Contractor shall keep the Engineer informed as to progress and give him not less than 7 days notice in advance of appropriate times for inspections and tests, and shall furnish him reasonable facilities, samples, and proper authority for access for inspection and tests, and for obtaining such information as he may desire.

8.5.3 Specific inspection points will be established by the Engineer, and the Contractor shall not proceed beyond that point until the Project Director's inspector or authorized agent has made or waived inspection. Any specific inspection may be waived at the option of the Project Director by notifying the Contractor in writing.

8.5.4 Field Erection Quality Assurance Engineer: The Contractor's organization shall be staffed in the field with an engineer experienced in quality assurance work who shall be designated as the Field Erection Quality Assurance Engineer. The Field Erection Quality Assurance Engineer shall have the responsibility to assure that the tests, examinations, qualifications, and record keeping requirements of this contract are being implemented by the Contractor's organization. The position of the Field Erection Quality Assurance Engineer in the Contractor's organization shall be free of the influences of erection cost and erection schedule. The Field Erection Quality Assurance Engineer shall have the authority to reject defective work performed by the Contractor and his subcontractors and to require the Contractor to take corrective action."

9. Scope of Project Manager Drawings: The drawings shall determine the general character and details of the work. Parts not detailed shall be constructed in accordance with best standard practice. Dimensions of drawings shall be followed in every case in preference to scale. Detail drawings shall take precedence over drawings to smaller scale. Any additional information required by the Contractor covering details not clearly showing on the drawings will be supplied in the form of additional sketches by the Engineer upon request by the Contractor. This additional information will be considered as an interpretation of drawings and not as extra work.

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Consequently, the Contractor will not be allowed any extra charges for work constructed in accordance with said additional information. 372 373

10. Superseded Project Manager Drawings: The Contractor will be required to receipt for copies of revised drawings and shall thereafter be responsible for all errors or omissions made due to the use of superseded drawings. 376 377

Add New Section 11
11. Extra Work or Changes by the Project Manager: The IPA reserves the right, without invalidating the contract, at any time during the progress of the work to require the Contractor to do extra work or make changes involving more or less labor, material or equipment than is contemplated in the contract or which is not subject to performance under the unit prices bid if such be the basis of compensation in the proposal. 379 380 381 382

"When extra work or changes are required, the Engineer will transmit to the Contractor a written request for a proposal covering the extra work or changes required, setting forth the work in detail, including any necessary plans and specifications and stating whether the proposal shall be in the form of unit prices or lump sum price. The Contractor, upon receipt of such request from the Engineer, shall submit in writing a proposal in the form requested, offering to perform such extra work or changes and including any claim for extension of time which may be necessary as a result of performing the extra work or changes. Under some circumstances, the proposal may be a credit allowance. 384 386 387 388 389 390 391 392 394

~~"In lieu of submitting proposals for extra field work, the Engineer may elect to require the Contractor to perform such extra field work or changes on a cost plus limited fee basis. Under such method, the Contractor shall bill the IPA on the following basis: 395 396 397 91 92~~

"(a) The IPA shall pay the Contractor the total cost of all labor furnished by the Contractor, plus 10 percent for overhead plus 10 percent for profit of such total cost (except that no percentage shall be added to the actual cost of bonus for overtime work, if any). Total cost of labor shall include all payroll disbursements and all disbursements for workmen's traveling time, traveling expense, subsistence expense, pay for holidays not worked and contributions for pensions, insurance or welfare funds, or for other purposes if the Contractor is required to make such disbursements, plus Workmens' Compensation, Public Liability and Unemployment Insurance, both Federal and State, and Old Age Benefit Taxes or levies or other taxes payable by the Contractor and imposed or assessed on payroll or otherwise in connection with the work stipulated herein at the rate in effect at the time of performance. Overtime rate shall be the overtime rate prevailing in the locality where work is to be performed. Overtime will not be paid without written order from the Project Director. 94 95 96 97 98 99 100 101 102 103 104

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"(D) If additional supervision or technical services are required by the extra scope of work, the IPA will pay the Contractor for supervisor, and for any specialist furnished by the Contractor, on a per diem basis at the basic rate in effect at the time of the work's performance per normal working day (or part thereof) of 8 hours on Mondays through Fridays, including intervening holidays not worked, and at a rate of 1-1/2 times the said basic rate for overtime work. The overtime rate shall apply to all work in excess of 8 hours on Mondays through Fridays and to all work on Saturdays, Sundays, and holidays.

"(c) Weekly work reports showing time of supervisor and specialists, also wages paid to labor, shall be presented by the Contractor's supervisor to the Project Director for approval and signature.

"(d) The IPA will pay for all small tools provided (original cost of \$500 or less) and consumable supplies at the rate of 8 percent of the cost of the straight time hours worked.

"(e) Contractor owned equipment, originally costing \$500 or more shall be provided at rates not to exceed the rates shown in the latest edition of the Associated Equipment Distributor's Handbook. If Contractor owned equipment is not available, the cost of equipment rented from others shall be billed at actual cost to the Contractor without additional markup.

"(f) If permanent materials or subcontracted work are used in the performance of the work, such material or work shall be billed to the IPA at cost plus 15 percent.

"No extra work shall be performed or changes made unless authorized by written Change Order issued by the IPA and no claim for an addition to the Contract Price shall be valid unless so ordered.

"The books and records pertaining to extra field work costs billed under this contract and the books and records of consultants, cost reimbursable subcontractors, and subcontractors engaged by the Contractor shall be subject to audit by the Project Director.

"Extra work or changes shall be covered by the faithful performance bond furnished under the contract although the order therefor be given without notice to the surety."

12. Changes at the Request of the Contractor: 400
Changes may be made to facilitate the work of the Contractor. 401
Any such change shall be requested in writing to the Engineer, 402
whose decision will be final. Any such change shall be without 403
additional cost to the IPA.

13. Packing Lists and Bills of Lading: 406
Packing lists, in triplicate, and Original Bills of Lading shall be 407
forwarded to the Construction Manager, Intermountain Power
Project Plant Site.

14. Interpretation of Contract and Bond: All matters relating to the validity, construction, interpretation and enforcement of the bid, bid bond, contract and Contractor's performance bond and Contractor's labor and material payment bond shall be determined according to the laws of the State of Utah. 410 411 412

15. Suspension of Work: The Engineer may, at any time, by notice in writing to the Contractor, suspend any part or portion of the work for such period of time as may be required, and the Contractor shall have no claim for extension of time, except as provided in Article 4 of Division E1, or for any damages or any additional compensation or otherwise on account of such partial suspension. 415 416 417 418

"However, when delays result from the acts or failure to act of the IPA or the Project Manager, not otherwise covered under Article 4 of Division E1, the Contractor will be reimbursed for its unavoidable direct costs."

Furthermore, the Project Director may at any time suspend the entire work upon written notice to the Contractor, who shall thereupon discontinue all work except such operations as may be necessary to prevent damage to property or to work already accomplished. Work shall be resumed by the Contractor after such suspension upon written notice from the Project Director. 420 421 422 423

The Contractor shall be paid as extra work in a manner as provided elsewhere herein for all costs of work performed in accordance with the orders of the Engineer during any such partial or entire suspension. If the work shall be delayed in consequence of any entire suspension of work, the Contractor shall also be entitled to an equivalent extension of time wherein to complete the work. The IPA will, upon resumption of the work by the Contractor, or upon termination of the contract without resumption of work, as hereinafter provided, pay the Contractor, actual or reasonable costs, during which the entire work shall have been suspended as provided in this Article. 425 426 427 428 429 430 431

The books and records pertaining to costs billed under this contract and the books and records of consultants, cost reimbursable subcontractors, and subcontractors engaged by the Contractor shall be subject to audit by an independent accounting firm, mutually agreed upon, under the direction of the Project Director at the IPA's cost or at the option of the Project Director, by the Contractor's independent accounting firm, under the direction of the Project Director at the Contractor's cost. It is understood that only an independent accounting firm shall have access to the Contractor's records. 433 434 435 436 437 438

In the event that the entire work shall be suspended by order of the Project Director, as herein provided, and shall remain so suspended for a period of 90 consecutive days, through no fault of the Contractor, and notice to resume work shall not have been served upon the Contractor as hereinbefore provided, 440 441 442 443

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the Contractor may, at his option, by written notice to the Project Manager, terminate the contract in the same manner as if the termination had been initiated by the Project Manager. The IPA will have no claim for damages because of such discontinuance or termination of the contract. 44 44

The foregoing provisions of this Article shall be construed as applying only to conditions that cannot be reasonably anticipated. The provisions of this Article shall not apply to any conditions or suspension of work cited in the Detailed Specifications, or suspension because of inclement weather, nature of the work, or operating necessities of the IPA or termination for breach. 44 44 45 45

"16. Termination of Contract: If at any time before completion of work herein contracted for, it shall be found by the Project Manager that reasons beyond the control of the parties hereto render it impossible or against the interests of the IPA to complete the work contracted to be done; or if the work shall be stopped by injunction of a court of competent jurisdiction, or by order of any competent authority; the Project Manager, at any time, by written notice to the Contractor may discontinue the work and terminate the Option to Erect Boiler Units or the entire contract; or if the entire work shall have been suspended for a period in excess of 90 consecutive days and termination is demanded by the Contractor, the contract shall be terminated. If the Option to Erect Boiler Units is terminated in accordance with this Article, the contract shall revert to the original terms and conditions under Division E1.

"Upon the service of such notice of termination, the Contractor shall discontinue the work in such manner, sequence, and at such times as the Engineer may direct, continuing and doing after said notice only such work and only until such time or times as the Engineer may direct; and the Contractor shall have no claim for damages for such discontinuance or termination of the contract; nor shall the Contractor have any claim for anticipated profits on the work thus dispensed with, nor any other claim except for the work actually performed up to the time of complete discontinuance, including any extra work ordered by the Engineer to be done after date of said order. ~~Contractor's termination charges~~ shall not exceed those set forth in the termination schedule of this contract, less any payments made pursuant to Article 19 of this Division and less the amount of any salvage which may be realized by the Contractor from any materials or equipment purchased or manufactured prior to termination and the value or credit resulting from utilization of any materials or equipment on another order. Any applicable escalation provisions shall be computed using the final published indices, prorated to the effective dated termination. Any overpayments or underpayments resulting from the above actions shall be invoiced accordingly.

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FOR OPTION TO ERECT BOILER UNITS

"In the event of such discontinuance and termination, the IPA may and, at the request of the Contractor, will ~~pay for~~ the Contractor all consumable supplies of the Contractor on hand, or in transit, or on uncancellable commitment, which, in the opinion of the Engineer, would have been suitable and required to complete the work if the contract had not been discontinued or terminated. The IPA will pay to the Contractor for such consumable supplies the prices paid therefor by the Contractor.

"The Contractor shall keep a separate account of the purchase and installation cost of plant, tools and equipment, including consumable supplies, and of all payments for labor chargeable to transportation and erection on such account, and shall at all times give the Engineer access to the records; shall maintain in his files, ~~subject to monthly inspection by the Engineer,~~ a complete set of certified bills and vouchers showing payments on such account; and upon such discontinuance and termination shall submit to the Engineer an itemized inventory and cost account of such plant, tools, and equipment, and consumable supplies as are then in use or to be used on the work.

"In the event that the work shall be so discontinued and the contract terminated, the satisfactory completion of such work as the Engineer may thereafter direct, and satisfactory compliance with the terms of said order, shall be deemed the completion of the work specified in this contract; and the final estimates shall be of the amount of work completed to the time of such discontinuance and termination, together with such other sums as may be due the Contractor in accordance with the provision of this Article and shall also, in the event that consumable supplies of the Contractor are purchased by the IPA, include the purchase prices thereof as herein provided."

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~~Any termination under this Article shall be without prejudice to any other rights of either Party which may have accrued prior to termination.~~ 476
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17. Equal Employment Opportunity: 479

17.1 Nondiscrimination: During the performance of this agreement, the Contractor agrees as follows: 482

17.1.1 The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, sex, age, or physical handicap. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, color, national origin, ancestry, sex, age, or physical handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Project Manager setting forth the provisions of this nondiscrimination clause. 484
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17.1.2 The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, national origin, ancestry, sex, age, or physical handicap. 497
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17.1.3 The Contractor will send to each labor union or representatives of workers with which the Contractor has a collective bargaining agreement or other contract or understanding a notice, to be provided by the Project Manager, advising the said labor union or worker's representative of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. 502
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17.1.4 The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor. 509
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17.1.5 The Contractor will furnish all information and reports required by Executive Order No. 11246 of 511
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September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Project Manager and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

17.1.6 In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract, or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions may be imposed and remedies invoked as provided in the said Executive Order or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

17.1.7 The Contractor will include the provisions of Subsections 17.1.1 through 17.1.7 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Project Manager may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Project Manager, the Contractor may request the United States and the IPA to enter into such litigation to protect the interests of the United States and of the IPA.

17.2 Affirmative Action: The IPA has received a right-of-way grant for the plant site and transmission line from the United States Bureau of Land Management. As a condition of that grant, all contractors and subcontractors of the IPA are required to and by entering into this Agreement, the Contractor does agree to the following:

The Contractor agrees not to exclude, on the grounds of race, creed, color, national origin, religion, age or sex, any person from participating in employment and procurement activity connected with this contract, and to ensure against such exclusion, the Contractor further agrees to develop and submit to the Authorized Officer of the Bureau of Land Management specific goals and timetables with respect to minority and female participation in employment and procurement

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activity connected with this contract as may be required by the Authorized Officer. The Contractor and each of his contractors and subcontractors will take affirmative action to utilize business enterprises owned and controlled by minorities or women in his procurement connected with this contract. The Contractor also agrees to post in conspicuous places on his premises which are available to his contractors, subcontractors, employees, or other interested individuals notices which set forth affirmative action terms, and to notify interested individuals such as bidders, contractors, purchasers, and labor unions or representatives of workers with whom he has collective bargaining agreements, of the Contractor's affirmative action obligations. The Contractor and each of his contractors and subcontractors will furnish all information and reports required by the Authorized Officer under the terms of this clause and will permit access to his facilities, books, records, and accounts by the Authorized Officer or his representative for purposes of ascertaining compliance. In the event of the Contractor's and each of his contractors' and subcontractors' noncompliance with these affirmative action responsibilities, compliance may be effected through all procedures authorized by law.

18. Invoices: Invoices shall be submitted in triplicate to Project Director, Intermountain Power Project, Room 931, P. O. Box 111, Los Angeles, California 90051, in accordance with Article 19 of this Division.

The contract number, Item number, and the calculations showing the total percentage of the Contract Price shall be shown on the invoice. In all cases, except in the case of any of the Options Relating to Erection of the Boiler Units, the amount of applicable sales tax or use tax shall be separately stated on the invoice, and the IPA will pay such amount as an additional charge to the quoted selling price.

19. Special Terms of Payment:

19.1 Special Terms of Payment for Furnishing and Delivering Boiler Units:

19.1.1 Furnished and Delivered Contract Price of a Boiler Unit: The Furnished and Delivered Contract Price for a Boiler Unit (Unit) shall be the price quoted for that Unit and the prices quoted for all of the Options Relating to Furnishing and Delivering the Boiler Units, except the Option to Furnish Plasma Torch Direct Ignition Systems, exercised for that Unit.

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<u>19.1.2 Payment for a Boiler Unit Prior to Price</u>	581
<u>Adjustment:</u> Starting on the first day of the twelfth month	583
prior to the scheduled shipment of the first pressure parts, as	
set forth in the approved schedules referred to in Subarticle	584
2.1 of Division F1, and on the first day of each month for 19	585
months thereafter, the Contractor shall submit an invoice for 5	
percent of the Furnished and Delivered Contract Price of a Unit.	586
With each invoice a duly certified progress report shall be	587
submitted certifying that the fabrication and delivery of	588
material coincides with the approved schedules. Payment of each	589
invoice shall be made within 30 calendar days of receipt	
provided, however, that no payments will be made so long as the	590
Contractor is not in compliance with the approved schedule.	
 <u>19.1.3 Irrevocable Letter of Credit:</u> The Contractor	593
shall establish an irrevocable Letter of Credit, as shown in	
Exhibit A, at a responsible bank within the State of Utah, in	594
the amount of 10 percent of the Furnished and Delivered Contract	
Price for each Unit. Such Letter of Credit shall be confirmed	595
by a United States bank satisfactory to the Contractor.	
 <u>19.1.4 Payment for a Plasma Torch Direct Ignition</u>	597
<u>System (PTDIS) Prior to Price Adjustment:</u>	598
 <u>19.1.4.1 Boiler Unit 1:</u> Payment will be made for the	601
PTDIS for Boiler Unit 1 within 30 calendar days after the	
Project Manager is satisfied with the performance of that PTDIS.	602
In any event, after 365 calendar days from synchronization of	603
Unit 1, either payment will be made for that PTDIS or that PTDIS	604
will be removed and returned to the Contractor.	
 The PTDIS shall perform satisfactorily by providing	606
reliable, safe, economical, and environmentally acceptable	607
boiler start-up and warm-up to a stable load condition without	
fuel oil when operated in accordance with instructions while	608
requiring only reasonable operating skills and maintenance. If	609
the Project Manager is not satisfied with the performance of	
that PTDIS, he shall have the option to instruct the Contractor	610
to remove that PTDIS and return it, f.o.b. the project site,	
without any cost to the IPP.	
 <u>19.1.4.2 Boiler Units 2, 3, and 4:</u> Payment for a	613
PTDIS for Boiler Units 2, 3, or 4 will be made within 30	
calendar days after delivery of a PTDIS or receipt of the	614
invoice therefor, whichever occurs later.	
 <u>19.2 Price Adjustment Clause:</u>	616

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California
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19.2.1 Boiler Units: The Furnished and Delivered Contract Price for a Unit shall be adjusted in accordance with provisions in this Subarticle. In determining the price adjustment, the percentage of increase or decrease shall be calculated to the nearest 0.1 percent, and the price increase or decrease shall be calculated to the nearest dollar. If the Indexes referred to in this Subarticle are not available for use in adjusting the contract price for a Unit, adjustment will then be made by means of similar Indexes.

Price Adjustment, based on the indexes and percentages described hereinafter, will be paid on each invoice issued. The escalation on each invoice shall be calculated using the index first published for the month in which the invoice is payable. Escalation of Contract Price covered by that invoice shall thereupon cease. For invoicing purposes, inasmuch as the above referenced index will not be available at the time of invoicing or at the due date of payment thereon, the last available index shall be used. An adjustment shall be made to correct the estimated escalation to the actual indexes in effect for each month in which an invoice was payable, and any difference between the estimated and actual escalation will be credited or debited as soon as practicable.

When any changes are made in the approved delivery schedule, in accordance with Article 4 or 15 of this Division, escalation will continue to the new approved delivery date.

In the event that Contract Price revisions are negotiated for changes in the contract, such revisions shall be priced to reflect the same numerical indexes specified hereinafter and shall be added to, or subtracted from the Base Contract Price to obtain a Revised Contract Price which shall be used as a basis for computing the material and shop labor price adjustments.

19.2.1.1 Engineering: For the purpose of this price adjustment provision only, the amount representing engineering is fixed at 10 percent for Unit 1 and 5 percent for the remaining Units of the Furnished and Delivered Contract Price. This amount will be adjusted based on the Table of Annual Salary for Selected, Professional, Administrative, and Technical Occupations, in the Engineering portion, Class V, as published in final form in the Handbook of Labor Statistics, Bulletin 2000 by the U.S. Department of Labor, Bureau of Labor Statistics. The Base Engineering Index shall be 33,141 which is the annual salary published for the year 1980. The monthly payment due shall be adjusted by the percentage by which the Engineering Index varies from the Base Engineering Index. If a monthly

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payment is made later than its due date because the Contractor has not met the approved schedules, that monthly payment shall be adjusted by the percentage by which the Engineering Index for the month in which that monthly payment was due or the Engineering Index for the month in which that monthly payment was actually made, whichever results in the lower monetary cost to the IPA, varies from the Base Drawings and Information Index.

19.2.1.2 Material: For the purpose of this price adjustment provision only, the amount representing material is fixed at 40 percent for Unit 1 and 45 percent for the remaining Units of the Furnished and Delivered Contract Price. This amount will be adjusted for changes in material cost based on the variation in the index representing the composite price of finished steel as published in Iron Age Magazine. The Index for finished steel is identified as being the one which is shown as 21.739 cents per pound on Page 95 in Iron Age Magazine, dated April 21, 1980. The Base Material Index shall be 22.108 which is the average of the Indexes published in Iron Age Magazine for the 3 consecutive months starting 4 months prior to the month in which the proposal is received. The material portion of the monthly payment due shall be adjusted by the percentage by which the Material Index for that month varies from the Base Material Index. If a monthly payment is made later than its due date because the Contractor has not met the approved schedules, that monthly payment shall be adjusted by the percentage by which the Material Index for the month in which that monthly payment was due or the Material Index for the month in which that monthly payment was actually made, whichever results in the lower monetary cost to the IPA, varies from the Base Material Index.

19.2.1.3 Shop Labor: For the purpose of this price adjustment provision only, the amount representing shop labor is fixed at 40 percent of the Furnished and Delivered Contract Price of a Unit. This shop labor amount will be adjusted based on the first average hourly earnings published in final form for Primary Metal Industries, Code 33, in Table C-2, Established Data Hours and Earnings, as published in Employment and Earnings by the U.S. Department of Labor, Bureau of Labor Statistics. The average hourly earnings for Primary Metal Industries is identified as being the one which is shown as 9.26 for January 1980 on Page 92 in Employment and Earnings, dated March 1980. The Base Shop Labor Index shall be 10.06 which is the average of the Indexes published in Employment and Earnings for the 6 consecutive months starting 7 months prior to the month in which the proposal is received. The shop labor portion of the monthly payment due shall be adjusted by the percentage by which the Shop Labor Index for that month varies from the Base Shop Labor Index. If a monthly payment is made later than its due date

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because the Contractor has not met the approved schedules, that 690
monthly payment shall be adjusted by the percentage by which the
Shop Labor Index for the month in which that monthly payment was 691
due or the Shop Labor Index for the month in which that monthly
payment was actually made, whichever results in the lower 692
monetary cost to the IPA, varies from the Base Shop Labor Index.

19.2.2 Plasma Torch Direct Ignition System: The 695
prices for the PTDIS for Boiler Units 1, 2, 3, and 4 will be
adjusted according to Subarticle 19.2.1 and to the Base Material 696
Index and Base Shop Labor Index as defined in Subarticles
19.2.1.2 and 19.2.1.3 of this Division, respectively. For the 698
purpose of this price adjustment provision only, the amount
representing material is fixed at 50 percent of the price of a 699
PTDIS and the amount representing shop labor is fixed at 50
percent of the price of a PTDIS. If delivery of a PTDIS is made 700
within the approved scheduled delivery period, an arithmetical
average for the Material Indexes and an arithmetical average for 701
the Shop Labor Indexes will be computed for the period beginning
a month before the shop fabrication for that PTDIS is started,
to and including the month in which that PTDIS is delivered. 704

The PTDIS for Unit 1 will be delivered no later than 60 days prior
to the "Erected complete in accordance with the contract and
ready for operating tests not later than" date as stated in Div.
F1, Article 2.1, page F1-1.

that PTDIS is not delivered within the period specified, the 704
Material and Shop Labor Indexes shall be either the Material and
Shop Labor Indexes computed above or the arithmetical average of 705
the Indexes for each month for the period beginning a month
before the shop fabrication for that PTDIS is started, to and 706
including the month starting on the last day of the period
specified, whichever results in the lower monetary cost to the 707
IPA.

19.3 Special Terms of Payment for Erection of 203
Boiler Units:

19.3.1 Erection Contract Price of a Boiler 205
Unit: The Erection Contract Price for a Boiler Unit (Unit) 206
shall be the price quoted for that Unit and the prices quoted 207
for all of Options Relating to Erection of the Boiler Units,
except the Option to Erect Plasma Torch Direct Ignition Systems, 208
exercised for that Unit.

19.3.2 Special Terms of Payment for All Boiler 210
Units: For the purpose of payment for erection of a Unit, the 211
Erection Contract Price of that Unit will be made as follows: 212

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<u>"19.3.2.1 Payment for Erection Prior to Price</u>	214
Adjustment: Prior to starting erection of a Boiler Unit, the	215
Contractor shall furnish a schedule showing the breakdown, by	216
identifiable milestones, of the portion of the Erection Contract	
Price of that Boiler Unit attributable to each segment of the	217
work. This schedule shall be submitted to the Engineer for	218
review and approval as representative of the actual progress of	219
the work. At the end of each calendar month during which	220
erection labor is performed, the Contractor shall furnish to the	221
IPA a duly certified estimate of the percentage of the total	
amount of erection labor performed during such calendar month on	222
each Unit stated separately, hereafter referred to as the	223
Progress Estimate. The Progress Estimate shall be approved by	224
the Engineer. The IPA will pay 95 percent of the amount of each	225
approved monthly Progress Estimate for erection within 30	226
calendar days after receipt by the IPA of such Progress	
Estimate.	
<u>"19.3.2.2 Final Payment:</u> The IPA will pay the	229
retained 5 percent of the Erection Contract Price of a Unit	
within 30 calendar days after Acceptance of the Unit.	230
<u>"19.3.3 Special Terms of Payment for Erection of a</u>	233
<u>Plasma Torch Direct Ignition System (PTDIS) Prior to Price</u>	235
Adjustment:	
<u>"19.3.3.1 Boiler Unit 1: Payment for the PTDIS</u>	238
for Boiler Unit 1 will be made in accordance with Subarticle	
19.1.4.1 of Division E1.	
<u>"19.3.3.2 Boiler Units 2, 3, and 4: Payment for a</u>	241
PTDIS for Boiler Units 2, 3, or 4 will be made within 30	
calendar days after complete installation of a PTDIS or receipt	242
of the invoice therefor, whichever occurs later.	
<u>"19.4 Price Adjustment Clause:</u>	244
<u>"19.4.1 Boiler Units: The Erection Contract Price</u>	247
of a Unit shall be adjusted as specified herein. For the	248
purpose of this price adjustment provision only, the amount	
representing erection price is fixed at 100 percent of the Base	249
Erection Contract Price. The adjustable portion of the Base	250
Erection Contract Price shall be based on the Nine Western State	
Boilermaker Field Agreement for boilermaker journeyman. The	252
Base Field Labor Index shall be \$22.112, which is the	
boilermaker journeyman's total hourly rate in effect February 2,	253
1981, and which includes (a) a direct hourly rate of \$14.31 for	254
wages, (b) an indirect hourly rate of \$6.34 for other labor	
costs, such as workmen's subsistence (travel) expense,	255
contributions to funds for pensions, health and welfare,	
apprenticeship and vacations, etc., and (c) \$1.462 for FICA, and	257
State and Federal Unemployment Insurance. Workers'	258
Compensation and Public Liability Insurance are not included in	
the Base Field Labor Index of \$22.112 as such insurance will be	
provided by the IPA. The Field Labor Index shall be determined	259
as the arithmetical average of the boilermaker journeyman's	
total hourly rate in effect on the first day of each month, from	260
the month in which the work begins until the month in which the	261
work is to be completed as specified in the Contract Schedule,	
as amended by any time extensions under the contract.	

"If the Field Labor Index varies from the Base Field Labor Index, the Contractor shall submit to the IPA a separate invoice or credit memorandum showing the calculations and the Indexes used for the amount of such adjustment.

~~"The amount of the adjustment will be verified by~~ the IPA. If payment is due the Contractor, payment of 95 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days after receipt of the invoice. Payment of the retained 5 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days of Acceptance of that Boiler Unit. If credit is due the IPA, a refund of 95 percent of the credit memorandum amount of the adjustment shall be made by the Contractor within 30 calendar days and the remaining 5 percent applied as credit to the final payment for that Boiler Unit.

"19.4.2 Plasma Torch Direct Ignition System: The erection contract prices for the PTDIS for Boiler Units 1, 2, 3, and 4 will be adjusted according to the Base Field Labor Index in Subarticle 19.4 of this Division. For the purpose of this price adjustment provision only, the amount representing erection price is fixed at 100 percent of the price of a PTDIS.

"The Field Labor Index shall be determined as the arithmetical average of the boilermaker journeyman's total hourly rate in effect on the first day of each month, from the month in which the work on a PTDIS for a Boiler Unit begins until the month in which the work on the PTDIS for that Boiler Unit is to be completed as specified in the Contract Schedule, as amended by any time extensions under the contract.

"If the Field Labor Index varies from the Base Field Labor Index, the Contractor shall submit to the IPA a separate invoice or credit memorandum showing the calculations and the Indexes used for the amount of such adjustment.

"The amount of the adjustment will be verified by the IPA. Upon complete installation of a PTDIS for a Boiler Unit, payment of 95 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days after receipt of the invoice. Payment of the retained 5 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days of Acceptance of that Boiler Unit. If credit is due the IPA, a refund of 95 percent of the credit memorandum amount of the adjustment shall be made by the Contractor within 30 calendar days and the remaining 5 percent applied as credit to the final payment for that Boiler Unit."

20. Payment and Price Adjustment for Spare Parts and Pulverizer Replacement Parts:

20.1. Payment: Payment for all spare parts or pulverizer replacement parts in a delivery will be made within 30 calendar days after that delivery or receipt of the invoice therefor, whichever occurs later.

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(j) It is the continuing policy of the Contractor and not discriminate against any employee or applicant for race, sex, color, creed, nationality, membership or non

(k) The Employer will deduct from the wage of each employee as certified by the Union when authorized by the

Deductions shall be made only where there is in effect Employer a voluntary written assignment executed by the furnished by the Union, and the deduction shall be remitted of the Lodge where the work is being performed at the time are required to be submitted.

The Employer shall forward to the office of the Local Union hours worked by each employee covered by this Agreement

RULE 3. CLASSIFICATIONS AND WAGE SCALES

HOURLY

ARIZONA

Classifications

10/1/80

*General Foreman

Foreman \$17.31

Assistant Foreman 16.81

Boilermaker/Blacksmith 16.31

CALIFORNIA & NEVADA

*General Foreman

Foreman 18.11

Assistant Foreman 17.61

Boilermaker/Blacksmith 17.11

NORTHERN IDAHO, OREGON & WASHINGTON

*General Foreman

Foreman 16.51

Assistant Foreman 16.01

Boilermaker/Blacksmith 15.51

ALASKA AREA

*General Foreman

Foreman 22.97

Assistant Foreman 21.97

Boilermaker/Blacksmith 20.97

NEW MEXICO

*General Foreman

Foreman 13.65

Assistant Foreman 13.15

Boilermaker/Blacksmith 12.65

SOUTHERN IDAHO AND UTAH

*General Foreman

Foreman 15.31

Assistant Foreman 14.81

Boilermaker/Blacksmith 14.31

*Rate to be negotiated

No. Idaho Counties - Benavah, Bonnar, Boundary, Clear
Nes Perce, Shoshone and Idaho.

Interpretation of Contract Terms, Costs, Travel and Substances

<u>Rule 8 - Travel Expenses & Substances</u> (Except Alaska and New Mexico - See Rule 22 and 23)	<u>10/1/80</u>	<u>1/1/81</u>	<u>4/1/81</u>	<u>10/1/81</u>	<u>4/1/82</u>
(a-1) Mileage (per mile)	\$0.12	\$0.12	\$0.12	\$0.12	\$0.12
(a-2) Travel Cost (per mile)	0.38	0.38	0.38	0.38	0.38
(a-3) Substances (per day)	\$22.00	\$22.00	\$22.00	\$23.00	\$23.00
<u>Rule 21 - Rental and Utilities</u>	\$1.275	\$1.30	\$1.30	\$1.30	\$1.30
<u>Rule 24 - Per diem</u> (per hour)	\$1.25	\$1.25	\$1.25	\$1.25	\$1.25
<u>Rule 25 - Apprenticeship</u> (per hour) ...	\$0.04	\$0.04	\$0.04	\$0.04	\$0.04
<u>Rule 26 - Vacation</u> (per hour)	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
(Except New Mexico)					
<u>Rule 26 - Vacation</u> (per hour) - New Mexico	\$0.75	\$0.75	\$0.75	\$0.85	\$0.85

Apprentice Rates (All Areas)

Percentage of Applicable
Area Journeymen Wage Rate

<u>Classification</u>	
1st six months	70%
2nd six months	72%
3rd six months	75%
4th six months	77%
5th six months	80%
6th six months	85%
7th six months	90%
8th six months	95%

When Contractor calls for a layman for field work and a man is furnished in answer to such call and performs layout work normally performed in the shop, he shall be considered a premium man and receive the Assistant Foreman's rate while performing such work.

The work of the Boilermaker (Journeyman or Mechanic) shall include: Boilermaking, Welding, Acetylene Burning, Signaling, Loading, Unloading, Hoisting, Chipping, Caulking, Rigging, Riveting, Bucking-up, Fitting-up, Grinding, Scaffolding Erecting, Blasting, Impact Machine Operating and such other work as is generally regarded as Boilermaker (Journeyman or Mechanic) work. Any employee classified as a Boilermaker shall perform any of the foregoing work of which he is capable.

A welder required to take a test who has been previously tested and certified by a Contractor within the last 24 month period and any other welder who passes the test successfully, shall be paid four (4) hours pay or the time required to take the test, whichever is greater, provided that he accepts employment for the work for which he was tested. Such payment is to be made on the first payday following such employment.

It is understood that he is to be placed on the payroll or released no later than the second working day following the day on which he was tested. If such welder refuses employment for the work for which he was tested or if he quits for other than compel-

furnished in accordance with Subarticle 3.4.1 of the Execution Document, or pulverizer replacement parts will be adjusted according to the Base Material Index and Base Shop Labor Index as defined in Subarticles 19.2.1.2 and 19.2.1.3 of this Division, respectively. For the purpose of this price adjustment provision only, the amount representing material is fixed at 50 percent of the price of a part and the amount representing shop labor is fixed at 50 percent of the price of a part. If deliveries are made within 60 calendar days after a Boiler Unit is erected complete, an arithmetical average for the

Material Indexes and an arithmetical average for the Shop Labor Indexes will be computed for the period beginning a month before the shop fabrication for the parts is started, to and including the month in which the parts are delivered. If the parts are not delivered within the period specified, the Material and Shop Labor Indexes shall be either the Material and Shop Labor Indexes computed above or the arithmetical average of the Indexes for each month for the period beginning a month before the shop fabrication for the parts is started, to and including the month starting on the last day of the period specified, whichever results in the lower monetary cost to the IPA.

21. Acceptance: Start-up and Acceptance Tests and inspections will be performed on a Boiler Unit by the Engineer, with assistance, in an advisory capacity, from the Contractor if requested. The Contractor will be notified of and may be represented at such tests and inspections.

When a Boiler Unit has been tested in accordance with the Operating Tests specified in Article 4 of Division G1, has operated correctly for 60 calendar days as shown on the operating daily log, has met the NOx emission limitations, and complies with the requirements of the contract, written Acceptance thereof will be made by the Project Director which will not be unreasonably withheld. If through no fault of the Contractor the Project Manager delays for a period of 365 calendar days after date of initial turbine synchronization in notifying the Contractor of such Acceptance, that Boiler Unit shall be deemed to have been accepted upon the last day of such 365 calendar day period.

If such Acceptance Tests and inspections show that a Boiler Unit does not meet the requirements set forth in these specifications, the Project Manager will promptly notify the Contractor of such deficiency, whereupon the Project Manager may elect to (a) accept the Unit; or (b) make the Unit available to the Contractor for correction within 6 months after notice of such deficiency, and retest the Unit within 45 days after correction; or (c) in the event the Project Manager does not accept the Unit under (a) and the Project Manager does not make the Unit available to correct the deficiencies under (b), then the Project Manager can refuse to accept the Boiler Unit and negotiate a settlement in accordance with Article 22.2 of this Division; in such case the conclusion of such settlement shall be considered as Acceptance.

All deficiencies shall be corrected at the Contractor's own expense with due diligence and dispatch, and the corrected Boiler Unit shall be retested and inspected, as

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appropriate, to demonstrate satisfactory completion of the 754
Acceptance Tests and inspections. The Contractor shall replace 755
all replacement parts, including those parts that have to be
replaced due to abnormal wear if such parts preclude the 756
achievement of the performance guarantees. The IPA shall not be 757
responsible for any materials or services which the Contractor
provides in conducting additional tests and inspections. 758

22. Guarantee: 760

22.1 General Guarantee: The Contractor shall 763
guarantee until one year after Acceptance of a Boiler Unit that
all design, equipment, materials, and workmanship of that Boiler 764
Unit shall be free from defects. The Contractor, at his option, 765
shall modify, adjust, repair, or replace all such defective
equipment, materials, or workmanship in place and use at his own 766
expense on a straight-time basis. The Project Manager will 767
remove and replace all peripheral equipment or facilities
necessary to provide the Contractor access to the Boiler Units 768
for corrective work at the Contractor's sole expense on a
straight-time basis. If, after Acceptance, the Boiler Unit is 769
not available for normal operation due to any failure to meet
the guarantee requirements, such time of forced outage shall not 770
be counted as part of the 12-month general guarantee period. 771

22.2 Performance Guarantee: The Contractor shall 774
guarantee that the Boiler Unit will meet the guaranteed
performance conditions as set forth in the specifications for 775
the guaranteed period and any extensions thereof.

If the field tests, performed at any time during the 777
guarantee period, indicate that such guaranteed performance 778
conditions are not met, the Contractor shall correct the defects
in accordance with Article 21 of this Division. 779

If the Contractor and IPA agree that such deficient 781
performance condition cannot be corrected, the IPA shall be 782
entitled to an amount negotiated by the parties as an equitable 783
settlement based on the amount and scope of such deficient
performance. The IPA will deduct such amount from the final 784
payment and, if such amount is in excess of the final payment,
invoice the Contractor for the difference. 785

22.3 Disclaimers: The sole liability of the 789
Contractor under this Article and the exclusive remedy of IPA
arising out of the manufacture, sale, furnishing, or erection of 790
the equipment hereunder or its use whether arising under
contract, tort (including negligence), strict liability, or

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DIVISION E2

Spec. 2010N
Revised May 29, 1981
SUPPLEMENTARY GENERAL CONDITIONS
FOR OPTION TO EFFECT BOILER UNITS

1.7 Page E1-21: Subarticle 22.1 is replaced with the following: 300

"22.1 General Guarantee: The Contractor shall 303
guarantee until 2 years after Acceptance of a Boiler Unit that
all design, equipment, materials, and workmanship of that Boiler 304
Unit shall be free from defects. The Contractor, at his option, 305
shall modify, adjust, repair, or replace all such defective 306
equipment, materials, or workmanship in place and use at his own
expense on a straight-time basis. The Project Manager will 307
remove and replace all peripheral equipment or facilities
necessary to provide the Contractor access to the Boiler Units 308
for corrective work at the Contractor's sole expense on a
straight-time basis. If, after Acceptance, the Boiler Unit is 309
not available for normal operation due to any failure to meet
the guarantee requirements, such time of forced outage shall not 311
be counted as part of the 2-year general guarantee period.
Additionally, the Contractor shall guarantee that each Boiler 312
Unit shall achieve 92 percent operational testing for each month 313
of the guarantee period. If during any month of the guarantee 314
period operational testing is less than 92 percent, that month
shall not be credited toward the 24-month guarantee period; in 315
such event, the guarantee period shall be extended as required 316
to obtain 24 calendar months of 92 percent operational testing.

"Operational testing shall refer to the ratio, 318
expressed as a percentage, of the number of hours during a month 319
in which the equipment is capable of a main steam flow of 6.6
million lbs/hr, with other corresponding conditions as specified 320
in Article 2 of Division G3 of these specifications, divided by
the total hours in the monthly period. During operational 322
testing, equipment will be operated and maintained by IPA in
accordance with procedures in the Contractor's Operating 323
Instructions, as mutually agreed to, and the advice of the
Contractor's Service representative.

"Each Boiler Unit shall be determined to be capable 325
of operation when the following conditions are met:

"(a) Contractor's equipment is available to 327
operate or is undergoing inspection or preventive maintenance 328
while balance of plant equipment is undergoing repair; and
maintenance or inspection not being mandatory prior to 329
restarting boiler unit.

"(b) A minimum of 6 pulverizers are in 331
operation or available for operation when using all specified 332

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coals except the blend of Coal Reserves B and F which may
require 7 pulverizers in operation. 333

"The optional extension of the guarantee period to 335
provide 24 months of 92 percent "operational testing" during the 336
guarantee period represents the exclusive liability for the
"operational testing" of each unit. No other guarantee is made 338
or shall be implied as to the availability of the unit."

otherwise, shall be the modification, adjustment, repair, or replacement as set forth above.

THE CONTRACTOR AND IPA AGREE THAT, IN CONSIDERATION OF THE ABOVE EXPRESS GENERAL GUARANTEE AND THE ENUMERATED PERFORMANCE GUARANTEE(S), ALL OTHER WARRANTIES AND GUARANTEES, OTHER THAN TITLE, EITHER EXPRESSED OR IMPLIED, WHETHER ARISING UNDER LAW OR EQUITY, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE EXCLUDED FROM THIS CONTRACT.

23. Conditions of Guarantees: The guarantees set forth in Article 22 of this Division shall be subject to the following conditions applicable to the item for which a breach of guarantee is claimed:

23.1 The Project Director will give the Contractor written notification of any defect in the work within a reasonable time after the Project Director becomes aware of such defect.

23.2 The Project Manager will operate and maintain the Boiler Units in accordance with the operation and maintenance procedures agreed upon by the parties.

23.3 The Project Manager will, at its option and at no cost to the Contractor, make available facilities at the jobsite during normal working hours to enable the Contractor in making guarantee corrections or repairs.

23.4 Completion of payments by the IPA for the Boiler Units shall not relieve the Contractor of any of its guarantee obligations.

23.5 Should the Contractor fail to promptly make the necessary corrections of defects, the Project Manager may perform or have performed the necessary guarantee correction work and backcharge the Contractor. Such work performed by or for the Project Manager shall not be construed so as to void the guarantee provisions.

23.6 This guarantee does not cover the effects of normal wear and tear; or abuse of the equipment; or the effects of normal abrasions, erosion, or corrosion; or the effects of improper storage or erection, if not within the Contractor's scope of work hereunder.

24. Consequential Damages and Limitation of Liability: In no event, whether as a result of breach of

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DIVISION E1

contract, tort liability (including negligence), strict liability, or otherwise, shall the Contractor or its suppliers be liable to the IPA for damages resulting from, loss of revenue, loss of use of revenue, loss of anticipated profits, cost of replacement power, and claims of any purchaser of the IPA arising out of the IPA's providing electric service to such purchaser, or any special, incidental, or consequential loss or damage of any nature arising at any time, or from any cause whatsoever resulting from the Contractor's performance or nonperformance of its obligations under the contract.

The Contractor's total liability to the IPA for all claims of any kind by the IPA, whether based upon contract, tort (including negligence), strict liability, or otherwise, for any loss or damage arising out of, connected with, or resulting from, the performance or breach of this contract, shall in no case exceed the amount of the Contract Price, including any price adjustment, of the Boiler Units. The foregoing limitations shall not apply to claims under Article 5.

The IPA and the Project Manager shall not be liable to the Contractor for any consequential damages including, but not limited to, loss of profits on work not performed and loss of the use of or underutilization of labor or facilities, or either of them, resulting from the Project Manager's or the IPA's performance or nonperformance of its obligations under the contract, or in the event of suspension of the work or termination of the contract.

Replace Article 25 with
25. Defaults: If the Contractor fails to perform any of its obligations under the contract and fails to give the Project Manager adequate assurance of performance within 15 working days after written demand by the Engineer therefor, then the Project Director may withhold payment of any further moneys which may be due the Contractor until the default is cured, or may declare the Contractor to be in default of the contract. The Project Manager will notify the Contractor and the IPA shall be entitled to cancel the contract in whole or in part. Any cancellation pursuant to this Article shall not be deemed a "termination" within the meaning of Article 16 of this Division and the IPA shall have the right to pursue remedies afforded by law.

26. Subcontractors: The Contractor shall at all times be responsible for the acts and omissions of subcontractors and persons directly or indirectly employed by them. Nothing in the contract shall constitute any contractual relationship between a subcontractor and the IPA or any

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1.8 <u>Page E1-23: Article 25 is replaced with the following:</u>	341
<u>"25. Termination for Breach:</u>	344
"25.1 If the work to be done under this contract shall be abandoned by the Contractor, or if the Contractor shall be adjudged a bankrupt, or shall make a general assignment for the benefit of creditors, or if a receiver of his property or business be appointed by a court of competent jurisdiction, or if this contract shall be assigned by him otherwise than as herein specified, or if at any time the Project Director shall determine that the performance of the Contractor is unnecessarily or unreasonably delayed, or that the Contractor is negligently or wilfully violating any of the covenants or conditions of the contract, or is executing the same in bad faith or not in accordance with the terms thereof, or refused or fails to prosecute the work or any separable part thereof with such diligence as will insure its completion within the time specified, or any extension thereof, or fails to complete the work within such time, the Project Director may in writing notify and instruct the Contractor to discontinue all work, or any part thereof under this contract.	346 347 348 349 350 351 352 354 355 356 357
"25.2 When such written notice is served upon the Contractor, as provided in Article 2 of Division E1, he shall immediately discontinue the work or such part thereof as is covered by the notice, and shall not resume the same except by <u>written instructions</u> from the Project Director. In any such case the IPA may take charge of the work and complete it by a new contract. In so doing, the IPA may take possession of and use any of the materials, plant, tools, equipment, supplies, and property of every kind provided by the Contractor for the purposes of his work. The IPA may procure other materials and provide labor for the completion of the same, or contract therefor, and charge the expense of completion by either method to the Contractor. These charges shall be deducted from such moneys as may be due or may at any time hereafter become due the Contractor under and by virtue of this contract, or any part	360 361 362 363 364 365 366 367 368 369

(E2-10)

DIVISION E2

Spec. 2010N
Revised May 29, 1981
SUPPLEMENTARY GENERAL CONDITIONS
FOR OPTION TO ERECT BOILER UNITS

thereof. In case such expense shall exceed the amount which 370
would have been due the Contractor under the contract if the 371
same had been completed by him, he shall pay the amount of such
excess to the IPA; and in case such expense shall be less than 372
the amount which would have been payable under this contract if 373
the same had been completed by the Contractor, he shall have no 374
claim to the difference except to such extent as may be
necessary, in the opinion of the Engineer, to reimburse the 375
Contractor or the Contractor's sureties for any expense properly
incurred for plant, camp, equipment, materials, supplies and 376
labor devoted to the prosecution of the work, of which the IPA 377
shall have received the benefit and which shall not have been 378
otherwise paid for by the IPA. In computing such expense, so 379
far as it shall relate to plant and equipment taken over by the
IPA, the salvage value of such plant and equipment, at 380
completion of the work, shall be deducted from the depreciated 381
value thereof at the time taken over by the IPA, and the
difference shall be considered as an expense. Evidence of such 382
expense, satisfactory to the Engineer, shall be required, and 383
all necessary estimates and appraisements shall be made by him. 384
When any particular part of the work is being carried on by the 385
IPA, by contract or otherwise, under the provisions of this 386
Article, the Contractor shall continue the remainder of the work
in conformity with the terms of his contract, and in such manner 387
as in nowise to hinder or interfere with the persons or workmen 388
employed as above provided, by the IPA, by contract or
otherwise, to do any part of the work, or to complete the same 389
under the provisions of this Article.

"25.3 As an alternative to be exercised solely by 391
the IPA for any of the reasons or conditions set forth in 392
Subarticle 25.1, supra, but in lieu of the notice to discontinue 393
all work, or any part thereof, under the contract, the IPA may
in writing notify the Contractor and his surety of its intention 394
to terminate the contract. Unless within 10 days after the 395
serving of such notices, such condition shall cease or 396
correction thereof be made, the contract shall cease and
terminate. The surety may, during said 10 days, give written 397
notice to the IPA of its election to take over and perform said 398
contract. Performance by the surety must be substantially 399
commenced and diligently prosecuted within 5 days after the 400
expiration of said 10-day period, otherwise the IPA may take
charge of the work and complete it as provided in Subarticle 401
25.1, supra, at the expense of the Contractor. In either event 402
he and his surety shall be liable to the IPA for the cost
occasioned thereby."

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DIVISION F1

obligation on the part of the IPA to pay, or to be responsible
for the payment of, any sums to any subcontractor. 858

The Contractor shall submit for approval of the 860
Engineer a list of all material and equipment he plans to 861
purchase from subcontractors identified by prospective
subcontractors. The Engineer shall have the right to approve 862
the Contractor's prospective supplier's list for each type of 863
material and equipment. There shall be no increase in cost to 864
the IPA for the material and equipment changes caused by
additions or deletions made to each supplier's list in order to 865
obtain the approval of the Engineer.

The Contractor shall not split subcontracts without 867
written approval of the Engineer.

27. Spare Parts: The Contractor shall guarantee that 870
spare parts for the Boiler Units, when ordered under the
contract, shall be interchangeable in fit and function with the 871
original Boiler Units and shall be in conformance with these 872
specifications. The provisions of Article 22 of this Division 873
and Article 23 of this Division, except that spare parts
installed by the IPA will be reinstalled by the IPA, shall apply 874
to such spare parts except that the guarantee period shall be 875
for one year from date of installation of such spare parts or
for the guarantee period of a Boiler Unit, whichever period 876
expires later.

The Project Manager will store the spare parts as 878
recommended by the Contractor.

28. Title: Title to the Boiler Units or any part 881
thereof as shipped shall pass from the Contractor to the IPA at
the Intermountain Power Project site in accordance with the 882
agreed f.o.b. terms of the contract.

Passage of title shall not be construed to impair the 884
rights of the Engineer to inspect the Boiler Units or any part 885
thereof after passage of title and to require the Contractor to
repair or replace the Boiler Units or any part thereof which 886
does not meet the requirements of the contract.

The Contractor shall guarantee that the Boiler Units 888
and appurtenances, including replacement parts, shall be free 889
and clear of all liens and encumbrances and free from defects
in title; and this guarantee of title shall continue without 890
time limitation.

If a defect in title appears at any time after the effective date of the contract, the Contractor shall defend the title of the Boiler Units against each and every entity and shall indemnify the IPA for any and all expenses incurred by the IPA as a result of any such action.

29. Liens: If a lien of any nature shall at any time be filed against a Boiler Unit or the Intermountain Power Project, or both of them, by any person or entity which has supplied material or services at the request of the Contractor or a subcontractor, the Contractor shall promptly, on demand by the Project Manager and at the Contractor's own expense, take any and all action necessary to cause any such lien to be released or discharged immediately therefrom.

30. Entire Agreement: The contract constitutes the sole, only, and entire agreement and understanding between parties as to the subject matter of the contract. Prior agreements, commitments or representations, expressed or implied, and discussions between Parties shall not be construed to be a part of the contract unless contained therein.

Any agreement between the parties or their employees which is not incorporated into the contract by a Change Order in accordance with Article 11 or 12 of this Division shall not be a contractual provision of the contract.

31. Publications: No disclosure or publication concerning the Boiler Units shall be made by the Contractor or subcontractor without prior written authorization by the Project Director.

32. Nonwaiver: The failure of the Project Manager or the IPA to enforce any of the terms and conditions or to exercise any right or privilege in the contract shall not be construed as a waiver of any such terms and conditions or right or privilege and the same shall continue and remain in force and in effect as if no such failure to enforce or exercise had occurred. No waiver by the Project Manager or the IPA shall be valid unless waived by a Change Order.

33. Risk of Loss: Risk of loss or damage with respect to a Boiler Unit or any part thereof shall be with the Contractor until the item has been delivered to the rail terminus and the Project Manager, or his representatives, has accepted the delivery by signing the carrier's bill of lading. Thereafter, the risk of loss or damage thereof shall be with the IPA.

1.9 Page E1-25: Article 33 is replaced with the following: 405

"33. Protection of Work and of Persons and Property: During performance of the work and up to the date of first firing of each Boiler Unit, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against damage, loss or injury; and, in the event of such damage, loss or injury, he shall, with due diligence and dispatch, replace or repair such work, whichever the Engineer shall determine to be preferable. Notwithstanding the obligations of this provision, the Contractor shall retain its rights of recovery under the Builders Risk Policy provided by the OCP specified in Subarticle 1.10 of this Division. The obligation to deliver finished work in strict accordance with the contract prior to such completion shall be absolute and shall not be affected by the Engineer's approval of or failure to prohibit means and methods of construction used by the Contractor. 407
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"The Contractor must take all reasonable precautions to protect the persons and property of others on or adjacent to the site from damage, loss or injury resulting from his operations under this contract, except such property as the owners thereof may themselves be under a legal duty to protect. This duty to protect shall include the duty to provide, place and adequately maintain at or about the site suitable and sufficient guards, lights, barricades and enclosures. 419
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"Within 3 days after notice to him of the happening of any such damage, loss or injury, the Contractor shall make a full and complete report thereof in writing to the Engineer. 426
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"The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor, any subcontractor, the IPA, or the Project Manager." 429
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1.10 Pages E1-26 Through E1-28: The following paragraphs are added to Article 35: 433

"The IPA will furnish certain primary insurance coverages by providing an Owner Controlled Insurance Program (hereinafter referred to as OCP), for the benefit of all onsite Contractors and subcontractors of all tiers who have jobsite employees. The OCP will consist of the following types of insurance with all contractors and subcontractors named as insureds: 435
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If a Boiler Unit or any part thereof is lost or damaged during shipment, the Contractor, at his own expense, shall repair or replace the damaged equipment, including freight charges where necessary.

After any loss or damage for which IPA shall have the risk of loss or damage, the Contractor shall, with due diligence and dispatch, repair or replace the lost or damaged discrete parts at IPA's expense so as not to delay the progress of the approved schedule.

34. Liability of Project Manager: It is understood and agreed that the IPA shall be the party solely liable to the Contractor for payments under this contract and for any breaches, defaults, or for any torts in the performance of this contract by the IPA or the Project Manager or any officers or employees thereof, and the Contractor hereby expressly covenants and agrees that no suit shall be brought by the Contractor against the Project Manager or its officers or employees or any of the purchasers of power from the IPA but that all rights or remedies that the Contractor may have or that may arise shall be asserted by the Contractor solely against the IPA.

35. Insurance: The Contractor shall secure and maintain such insurance from an insurance company authorized to write casualty insurance in the state where the work is located as will protect himself and his subcontractors from claims for bodily injury, death, or property damage which may arise from operations under this contract. The Contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and shall have filed a Certificate of Insurance with the IPA. Each insurance policy shall contain a clause providing that it shall not be cancelled by the insurance company without 30 calendar days' written notice to the IPA of intention to cancel. The amounts of such insurance shall be not less than the following:

(a) Workers' Compensation covering all of the Contractor's employees in accordance with the laws of any state in which the work is to be performed and including Employers Liability Insurance with a limit of not less than \$1,000,000.00 each accident.

(b) Comprehensive General and Automobile Liability Insurance with Contractual Liability, Product and Completed Operations and Broad Form Property Damage coverage included which shall provide not less than \$1,000,000.00 Combined Single Limit per occurrence (Bodily Injury and Property Damage Liability). Said insurance shall protect against claims which

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may arise out of or result from the operations under the contract, whether such operations be by Contractor or by a subcontractor or by any one directly or indirectly employed by any of them, or by any one for whose acts any of them may be liable.	961 962
(c) Contractor's Equipment All Risk Floater Insurance with a limit of at least \$500,000.00 each occurrence covering owned, hired, or furnished equipment used by the Contractor.	964 965
(d) If the Contractor or his subcontractors use owned, chartered, leased, or hired aircraft in their operations, the Contractor and his subcontractors shall maintain aircraft bodily injury and property damage liability insurance with a combined single limit of at least \$10,000,000.	967 968 969
(e) Umbrella Liability with limits of \$10,000,000.00 per occurrence and annual aggregate.	971
(f) Owner's Protective Liability policy in the name of the IPA, the Project Manager, and their officers, agents, and employees while acting within the scope of their employment on the Contractor's premises, with a limit of \$10,000,000.00 per occurrence and annual aggregate. This policy shall be subject to review and approval of the Project Director.	973 974 976
(g) The Owner's Protective Liability Policy provided under (f) above shall be primary and any other insurance carried by the IPA or Project Manager which may be applicable, shall be deemed to be excess insurance and the Contractor's insurance primary for all purposes despite any conflicting provision in the Contractor's policy to the contrary.	978 979 980 981
(h) The foregoing requirements as to types, limits, and the IPA's approval of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor under the contract.	983 984 985
(i) The Contractor shall require its insurance carriers furnishing insurance to waive all rights of subrogation against the IPA and the Project Manager, their directors, officers, agents, and employees.	987 988
(j) All Certificates of Insurance must clearly state that all applicable requirements have been satisfied. Certificates of Insurance for the Contractor furnished insurance	990 991 992

DIVISION E2

1.9 Page E1-25: Article 33 is replaced with the 405
following:

33. Protection of Work and of Persons and 407
Property: During performance of the work and up to the date of 408
first firing of each Boiler Unit, the Contractor shall be under 409
an absolute obligation to protect the finished and unfinished 410
work against damage, loss or injury: and, in the event of such 411
damage, loss or injury, he shall, with due diligence and 412
dispatch, replace or repair such work, whichever the Engineer 413
shall determine to be preferable. Notwithstanding the 414
obligations of this provision, the Contractor shall retain its 415
rights of recovery under the Builders Risk Policy provided by 416
the OCP specified in Subarticle 1.10 of this Division. The 417
obligation to deliver finished work in strict accordance with 418
the contract prior to such completion shall be absolute and 419
shall not be affected by the Engineer's approval of or failure 420
to prohibit means and methods of construction used by the 421
Contractor. 422

"The Contractor must take all reasonable 423
precautions to protect the persons and property of others on or 424
adjacent to the site from damage, loss or injury resulting from 425
his operations under this contract, except such property as the 426
owners thereof may themselves be under a legal duty to protect. 427
This duty to protect shall include the duty to provide, place 428
and adequately maintain at or about the site suitable and 429
sufficient guards, lights, barricades and enclosures. 430

"Within 3 days after notice to him of the happening 431
of any such damage, loss or injury, the Contractor shall make a 432
full and complete report thereof in writing to the Engineer. 433

"The provisions of this Article shall not be deemed 434
to create any new right of action in favor of third parties 435
against the Contractor, any subcontractor, the IPA, or the 436
Project Manager." 437

1.10 Pages F1-26 Through E1-28: The following 438
paragraphs are added to Article 35:

"The IPA will furnish certain primary insurance 439
coverages by providing an Owner Controlled Insurance Program 440
(hereinafter referred to as OCP), for the benefit of all onsite 441
Contractors and subcontractors of all tiers who have jobsite 442
employees. The OCP will consist of the following types of 443
insurance with all contractors and subcontractors named as 444
insureds: 445

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"(a) Workers' Compensation and Employer's Liability: 441
The Workers' Compensation insurance will conform to the laws of 443
the State of Utah. The Workers' Compensation insurance will 444
include a U. S. Longshoremen and Harbor Workers Act Endorsement,
an All States Endorsement, and the Voluntary Compensation 445
Endorsement. Employer's Liability insurance will have a limit 446
of \$1,000,000.00. The Workers' Compensation policy will be 447
primary insurance and noncontributing with respect to persons 448
directly engaged in performance of work on the jobsite.

"(b) Comprehensive General Liability: The 451
Comprehensive General Liability insurance (excluding Automobile 452
Liability) will provide bodily injury, personal injury, and
property damage liability coverage, subject to a combined single 454
limit of \$1,000,000.00 per named insured. The coverage will
include Blanket Contractual, Contractors' Protective, Products 455
and Completed Operations including Broad Form Property Damage 456
and will have no XCU exclusions. The Completed Operations
coverage will remain in force for a period of 2 years, following 457
final acceptance of the work under this contract.

"Annual aggregate limits of \$1,000,000.00 will 459
apply where applicable to each contractor and subcontractor.

"The Comprehensive General Liability policy will be 461
primary insurance and noncontributing with any other insurance 462
carried by the Contractor or any of his subcontractors.

"(c) Excess Liability: The Excess Liability 465
insurance (excluding Automobile Liability) will provide bodily 466
injury, personal injury, and property damage liability, subject 467
to a combined single limit of \$50,000,000.00 per occurrence and 468
annual aggregate for all contractors and subcontractors. Such
insurance shall be noncontributing with any other insurance
carried by the Contractor or any of his subcontractors.

"(d) Certificates and Policies: The Contractor 471
and his subcontractors will be named insureds on the insurance 472
provided by the OCP. Prior to the time that work is performed
at the jobsite, the insurer will issue certificates of 473
Comprehensive General Liability and Excess Liability (excluding
Automobile Liability) insurance to the Contractor and his 474
subcontractors covering the liabilities of the Contractor or 475
subcontractors, except as otherwise provided in this policy,
arising out of injury, loss or damage suffered or incurred at
the jobsite and injury, loss or damage occurring elsewhere 476
resulting from operations, activities, incidents or occurrences
at the jobsite. The insurer will also issue a Workers' 477

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Compensation policy in the name of each contractor and subcontractor.

"Inclusion of more than one insured under such insurance shall not operate to impair the rights of one insured against another insured, and the coverages and limits afforded by such insurance shall apply as though a separate policy had been issued to each insured. It shall also be a provision of this contract that the insurer shall have no rights of subrogation to any of the named insureds or their associated and/or affiliated companies and/or their subcontractors.

"(e) Premiums: The Contractor or his subcontractor shall not by reason of their inclusion under the insurance provided for by the OCP incur any liability for payment of premium for the OCP insurance. In consideration of the IPA's payment of premium for such insurance, the Contractor and his subcontractors shall assign to the IPA all return premiums, premium refunds, dividends, refunds, discounts or other credits and any other monies due or to become due to it in connection with such insurance. The Contractor and his subcontractors shall execute such other agreements and documents, if any, which may be necessary to give effect to this assignment.

"(f) Builder's Risk: The IPA will provide "All Risk" Builder's Risk insurance with a limit sufficient to cover values at risk in transit and/or at the jobsite and subject to deductibles to be determined by the IPA. The first \$5,000.00 of any loss under this insurance shall be for the account of the Contractor or his subcontractor.

"Coverage will be provided for property in transit and at the jobsite intending for building, erection, assembly and/or installation. THE POLICY WILL NOT COVER EITHER LEASED PROPERTY OR CONSTRUCTION TYPE TOOLS, EQUIPMENT AND MACHINERY USED FOR CONSTRUCTION AND NOT INTENDED TO FORM A PERMANENT PART OF THE WORK.

"(g) Subcontracts: The Contractor shall notify the Project Director of the execution of any subcontract with each subcontractor and upon such notice, the subcontractor will be notified by the Project Director of the subcontractor's inclusion in the insurance set forth in Subarticles a, b, c, and f above. At the time of execution of each subcontract and as a condition precedent to the subcontractor's and/or the IPA's duty to perform, the subcontractor shall furnish the Project Director a completed application for insurance.

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"(h) <u>Inspection of Policies and Exclusion of Costs:</u>	513
Copies of the policies affording the coverages described in	515
Subarticles a, b, c, and f above will be available for review at	516
the IPA's offices at the jobsite and at the Project Manager's office.	
"The Contractor and his subcontractor's contract	518
prices shall exclude all costs of insurances related to the	519
coverages described and provided by the IPA. Should the	520
Contractor or any subcontractor maintain his own insurance, the	
cost shall not be reimbursed by the Contractor and will not be	521
reimbursed by the IPA.	
"(i) <u>Termination of IPA-Furnished Insurance:</u> The	524
IPA reserves the option to terminate the OCP or any part	
thereof. The IPA will give the Contractor and each insured	525
subcontractor 30 days advance notice prior to exercising this	526
option to terminate such insurance and thereafter the Contractor	
and each subcontractor shall obtain during the duration of his	527
work replacement insurance comparable to that which was	528
terminated. The reasonable cost of such replacement insurance	529
will be reimbursed by the IPA. The Contractor and	530
subcontractors shall provide the Project Manager with evidence	
of such insurance.	
"(j) <u>Liability and Obligations:</u> The insurance	533
coverages provided by the IPA at its election for the Contractor	
and his subcontractors are not intended to and shall not in any	534
manner limit or qualify the liabilities and obligations assumed	535
by the Contractor and his subcontractors under this contract.	
"(k) <u>Cooperation with Insurers:</u> The Contractor	538
and his subcontractors shall cooperate with the OCP insurers.	
An insurance manual outlining the OCP will be furnished in	539
connection with this contract. The Contractor and his	540
subcontractors shall complete application forms and payroll	
audit forms and shall follow procedures as outlined in the	541
insurance manual. Insurers of the OCP will provide the services	542
of a safety staff to the IPA and the Contractor and his	
subcontractors. The Contractor and his subcontractors shall	543
give full cooperation to the safety and/or loss control staff	
assigned by the IPA or Project Manager and the insurance	544
company."	

1.11 Page E1-28: The following paragraph is added to 547
Article 36:

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Add to C

"For any work performed by the Contractor's or subcontractor's employees at the plant site, the Contractor shall comply with all of the provisions of (a) safe place statutes or similar provisions pertaining to the work place or safety, (b) the Workers' Compensation Insurance and Safety Acts of the State of Utah, (c) Utah Code and Industrial Commission of Utah, Safety Division, Boiler and Pressure Vessel Rules and Regulations, and (d) all similar Utah or Federal Acts or laws applicable and in effect on February 2, 1981, and the Contractor shall also defend at his own cost and indemnify and hold harmless IPA, its officers, agents, employees, assignees, and successors in interest from and against any and all liability damages, costs, losses, claims, demands, actions, causes of action, attorney's fees and expenses, or any of them, presented, brought or recovered against the IPA or which may be incurred by the IPA as a result of the Contractor's performance or nonperformance of said work related to noncompliance of a, b, c, and d above.

1.12 Pages E1-28 and E1-29: Article 37 is replaced with the following:

"37. Liquidated Damages: It will be impracticable or extremely difficult to fix the actual damage that may result from any delay in completion of erection at the time agreed upon. It is, therefore, stipulated and agreed that if the erection work required for boilout covered by the contract is not completed on or before the time of completion set forth in these specifications, or within such extensions of time as may be granted, the Contractor shall pay to the IPA, or the IPA may deduct from any moneys due the Contractor, the sum of \$500,000.00 per calendar week as agreed fixed and liquidated damages and not as a penalty for each full calendar week subsequent to the agreed date of completion during which any part of such erection work stipulated under the contract remains uncompleted; provided, however, that (a) liquidated damages shall not be due or payable for the first 10 calendar days delay in completion of erection of a Unit, that (b) payment of liquidated damages hereunder shall not be due or payable for delay in completion of such erection of a Unit if IPA would not have been able to perform boilout on a Unit notwithstanding such delayed completion of such erection, that (c) payment of liquidated damages shall not be due or payable for delay in completion of such erection of parts of a Unit that do not delay boilout of such Unit, and that (d) payment of liquidated damages hereunder shall in no event exceed \$14,000,000.00 for Unit 1, \$12,000,000.00 for Unit 2, \$10,000,000.00 for Unit 3, and \$8,000,000.00 for Unit 4.

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"No liquidated damages shall apply for delays in 584
delivery, pursuant to Article 4 of Division E1, of items 585
supplied by subcontractors (not affiliated with the Contractor)
of major accessory equipment provided the Contractor has given 586
notice, of the potential for such delay, to the Project
Director.

"IPA agrees that the payment of liquidated damages 588
shall constitute the sole and exclusive liability of the 589
Contractor, and the sole and exclusive remedy of IPA for late
completion of erection of a Unit."

and any cancellations, terminations, and alterations of such policies shall be mailed to the Project Manager. 993

(k) The IPA will furnish for work at the jobsite certain primary insurances required above by submitting an owner controlled insurance program hereinafter referred to as OCP, for benefit of Contractors of all tiers as named insureds (those with jobsite employees). If the Contractor has employees at the jobsite, they will be in the OCP for Workers' Compensation, Comprehensive General Liability, Umbrella Liability and Builders Risk coverages. 995
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36. Indemnification Clause: The Contractor undertakes and agrees to defend, indemnify, and hold harmless the IPA and Project Manager and any and all of their officers, agents, employees, assigns, and successors in interest from and against all suits and causes of action, claims, loss, demands, expense, including, but not limited to, attorney's fees and costs of litigation, damage or liability of any nature whatsoever, for death or injury to any person, including Contractor's employees and agents, or damage or destruction to any property of either party hereto or third persons in any manner arising by reason of or incident to, and during, the performance of this contract on the part of the Contractor, whether or not contributed to by any act or omission, active or passive, negligent or otherwise, except for sole negligence of the IPA or Project Manager, or any of their officers, agents, employees, or assigns and successors in interest. 1002
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37. Liquidated Damages: If it will be impracticable or extremely difficult to fix the actual damage that may result from any delay in deliveries at the times agreed upon. It is, therefore, stipulated and agreed that if deliveries of the Key Items specified in Subarticle 2.1 of Division F1 are not completed on or before the dates of deliveries specified in Subarticle 2.1 of Division F1, or within such extensions of time as may be granted, the Contractor shall pay to the IPA or the IPA may deduct from any moneys due the Contractor, the sum of \$150,000.00 per full calendar week for the seventh through the eleventh weeks of delay, \$250,000.00 per full calendar week for the twelfth through the nineteenth weeks of delay, and \$300,000.00 per full calendar week for each subsequent full calendar week of delay as agreed fixed and liquidated damages and not as a penalty for each full calendar week subsequent to the agreed dates of deliveries during which delivery of any part of the abovementioned Key Items for a Unit remains uncompleted; provided, however, that (a) liquidated damages shall not be due or payable for the first 45 calendar days delay in delivery of the abovementioned Key Items for a Unit, that (b) payment of 1013
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DIVISION E1

liquidated damages hereunder shall not be due or payable if
delay in delivery of any of the abovementioned Key Items for a 1028
Unit does not delay the construction of a Unit, that (c) 1029
liquidated damages shall be assessed for delay in delivery of
only one such Key Item during any calendar week at the highest 1030
rate applicable for such week as to any such Key Item, and that 1031
(d) payment of liquidated damages hereunder shall in no event
exceed \$10,000,000.00 for Unit 1, \$8,500,000.00 for Unit 2, 1032
\$7,000,000.00 for Unit 3, and \$6,000,000.00 for Unit 4.

IPA agrees that the payment of liquidated damages 1034
shall constitute the sole and exclusive liability of the 1035
Contractor, and the sole and exclusive remedy of IPA for late
deliveries of equipment and material for a Unit. 1036

38. Taxes: The Contract Price herein for furnishing 1039
and delivering equipment and material is exclusive of any sales
or use taxes.

The Contract Price for furnishing and delivering 1041
material is also exclusive of Federal excise taxes pursuant to 1042
exemption of political subdivisions of a State by Federal law.

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JS.K.
PART E - DIVISION E2

SUPPLEMENTARY GENERAL CONDITIONS
FOR OPTION TO ERECT BOILER UNITS

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1. <u>Modifications and Additions to the General Conditions:</u> If the Option to Erect Boiler Units is exercised, Articles 2 through 15 are added to the General Conditions (Division E1), and the General Conditions is modified as follows:	22
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1.1 <u>Page E1-4:</u> The first 3 lines of Article 4 now reading:	27
"Delivery shall be completed within the periods, or by the dates specified in the contract; provided, however, that time for delivery will be extended by a period equivalent to any delay"	29
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are changed to read:	32
"All work shall be completed within the periods specified in the contract; provided, however, that time for the completion of the work will be extended by a period equivalent to any delay"	34
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1.2 <u>Page E1-9:</u> The following Subarticles are added after Subarticle 8.4.7:	38
"8.5 <u>Inspection of Field Work:</u>	40
"8.5.1 All material and field work done shall be subject to inspection by the Engineer. Such inspection shall not relieve the Contractor of the responsibility of furnishing the best labor and materials in strict accordance with the specifications. Any material or field work approved and later found to be defective through the guarantee period shall be repaired or replaced without cost to the IPA. The Contractor shall ask for the Engineer's approval only after his own thorough inspection and after he is satisfied he has met all requirements of the specifications.	42
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"8.5.2 The Contractor shall keep the Engineer informed as to progress and give him not less than 7 days notice in advance of appropriate times for inspections and tests, and shall furnish him reasonable facilities, samples, and proper authority for access for inspection and tests, and for obtaining such information as he may desire.	50
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"9.5.3 Specific inspection points will be established by the Engineer, and the Contractor shall not proceed beyond that point until the Project Director's inspector or authorized agent has made or waived inspection. Any specific inspection may be waived at the option of the Project Director by notifying the Contractor in writing.

"9.5.4 Field Erection Quality Assurance Engineer: The Contractor's organization shall be staffed in the field with an engineer experienced in quality assurance work who shall be designated as the Field Erection Quality Assurance Engineer. The Field Erection Quality Assurance Engineer shall have the responsibility to assure that the tests, examinations, qualifications, and record keeping requirements of this contract are being implemented by the Contractor's organization. The position of the Field Erection Quality Assurance Engineer in the Contractor's organization shall be free of the influences of erection cost and erection schedule. The Field Erection Quality Assurance Engineer shall have the authority to reject defective work performed by the Contractor and his subcontractors and to require the Contractor to take corrective action."

1.3 Page E1-10: Article 11 is replaced with the following:

"11. Extra Work or Changes by the Project Manager: The IPA reserves the right, without invalidating the contract, at any time during the progress of the work to require the Contractor to do extra work or make changes involving more or less labor, material or equipment than is contemplated in the contract or which is not subject to performance under the unit prices bid if such be the basis of compensation in the proposal.

"When extra work or changes are required, the Engineer will transmit to the Contractor a written request for a proposal covering the extra work or changes required, setting forth the work in detail, including any necessary plans and specifications and stating whether the proposal shall be in the form of unit prices or lump sum price. The Contractor, upon receipt of such request from the Engineer, shall submit in writing a proposal in the form requested, offering to perform such extra work or changes and including any claim for extension of time which may be necessary as a result of performing the extra work or changes. Under some circumstances, the proposal may be a credit allowance.

"In lieu of requesting proposals for extra field work, the Engineer may elect to order the Contractor to perform

DIVISION E2

such extra field work or changes on a cost-plus-limited basis.	91
Under such method, the Contractor shall bill the IPA on the following basis:	92
"(a) The IPA shall pay the Contractor the total cost of all labor furnished by the Contractor, plus 10 percent for overhead plus 10 percent for profit of such total cost (except that no percentage shall be added to the actual cost of bonus for overtime work, if any). Total cost of labor shall include all payroll disbursements and all disbursements for workmen's traveling time, traveling expense, subsistence expense, pay for holidays not worked and contributions for pensions, insurance or welfare funds, or for other purposes if the Contractor is required to make such disbursements, plus Workmens' Compensation, Public Liability and Unemployment Insurance, both Federal and State, and Old Age Benefit Taxes or levies or other taxes payable by the Contractor and imposed or assessed on payroll or otherwise in connection with the work stipulated herein at the rate in effect at the time of performance. Overtime rate shall be the overtime rate prevailing in the locality where work is to be performed. Overtime will not be performed without written order from the Project Director.	94 95 96 97 98 99 100 101 102 103 104
"(b) If additional supervision or technical services are required by the extra scope of work, the IPA will pay the Contractor for supervisor, and for any specialist furnished by the Contractor, on a per diem basis at the basic rate in effect at the time of the work's performance per normal working day (or part thereof) of 8 hours on Mondays through Fridays, including intervening holidays not worked, and at a rate of 1-1/2 times the said basic rate for overtime work. The overtime rate shall apply to all work in excess of 8 hours on Mondays through Fridays and to all work on Saturdays, Sundays, and holidays.	106 107 108 109 110 111 112
"(c) Weekly work reports showing time of supervisor and specialists, also wages paid to labor, shall be presented by the Contractor's supervisor to the Project Director for approval and signature.	114 115
"(d) The IPA will pay for all small tools provided (original cost of \$500 or less) and consumable supplies at the rate of 8 percent of the cost of the straight time hours worked.	117 118
"(e) Contractor owned equipment, originally costing \$500 or more shall be provided at rates not to exceed	120 121

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

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the rates shown in the latest edition of the Associated Equipment Distributor's Handbook. If Contractor owned equipment is not available, the cost of equipment rented from others shall be billed at actual cost to the Contractor without additional markup. 122 123

"(f) If permanent materials or subcontracted work are used in the performance of the work, such material or work shall be billed to the IPA at cost plus 15 percent. 125 126

"No extra work shall be performed or changes made unless authorized by written Change Order issued by the IPA and no claim for an addition to the Contract Price shall be valid unless so ordered. 127 128

"The books and records pertaining to extra field work costs billed under this contract and the books and records of consultants, cost reimbursable subcontractors, and subcontractors engaged by the Contractor shall be subject to audit by the Project Director. 131 132 133

"Extra work or changes shall be covered by the faithful performance bond furnished under the contract although the order therefor be given without notice to the surety." 135 136

1.4 Pages E1-11 and E1-12: The following sentence is added to the first paragraph of Article 15: 137

"However, when delays result from the acts or failure to act of the IPA or the Project Manager, not otherwise covered under Article 4 of Division E1, the Contractor will be reimbursed for its unavoidable direct costs." 141 142 143

1.5 Page E1-12: Article 16 is replaced with the following: 146

"16. Termination of Contract: If at any time before completion of work herein contracted for, it shall be found by the Project Manager that reasons beyond the control of the parties hereto render it impossible or against the interests of the IPA to complete the work contracted to be done; or if the work shall be stopped by injunction of a court of competent jurisdiction, or by order of any competent authority; the Project Manager, at any time, by written notice to the Contractor may discontinue the work and terminate the Option to Erect Boiler Units or the entire contract; or if the entire work shall have been suspended for a period in excess of 90 consecutive days and termination is demanded by the Contractor, 147 148 149 150 151 152 153 154 155

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the contract shall be terminated. If the Option to Erect Boiler Units is terminated in accordance with this Article, the contract shall revert to the original terms and conditions under Division E1.

"Upon the service of such notice of termination, the Contractor shall discontinue the work in such manner, sequence, and at such times as the Engineer may direct, continuing and doing after said notice only such work and only until such time or times as the Engineer may direct; and the Contractor shall have no claim for damages for such discontinuance or termination of the contract; nor shall the Contractor have any claim for anticipated profits on the work thus dispensed with, nor any other claim except for the work actually performed up to the time of complete discontinuance, including any extra work ordered by the Engineer to be done after date of said order. Contractor's termination charges shall not exceed those set forth in the termination schedule of this contract, less any payments made pursuant to Article 12 of this Division and less the amount of any salvage which may be realized by the Contractor from any materials or equipment purchased or manufactured prior to termination and the value or credit resulting from utilization of any materials or equipment on another order. Any applicable escalation provisions shall be computed using the final published indices, prorated to the effective dated termination. Any overpayments or underpayments resulting from the above actions shall be invoiced accordingly.

"In the event of such discontinuance and termination, the IPA may and, at the request of the Contractor, will purchase from the Contractor all consumable supplies of the Contractor on hand, or in transit, or on uncancellable commitment, which, in the opinion of the Engineer, would have been suitable and required to complete the work if the contract had not been discontinued or terminated. The IPA will pay to the Contractor for such consumable supplies the prices paid therefor by the Contractor.

"The Contractor shall keep a separate account of the purchase and installation cost of plant, tools and equipment, including consumable supplies, and of all payments for labor chargeable to transportation and erection on such account, and shall at all times give the Engineer access to the records; shall maintain in his files, subject to monthly inspection by the Engineer, a complete set of certified bills and vouchers showing payments on such account; and upon such discontinuance and termination shall submit to the Engineer an itemized inventory and cost account of such plant, tools, and

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equipment, and consumable supplies as are then in use or to be
used on the work. 199

"In the event that the work shall be so 191
discontinued and the contract terminated, the satisfactory 192
completion of such work as the Engineer may thereafter direct,
and satisfactory compliance with the terms of said order, shall 193
be deemed the completion of the work specified in this contract; 194
and the final estimates shall be of the amount of work completed
to the time of such discontinuance and termination, together 195
with such other sums as may be due the Contractor in accordance 196
with the provision of this Article and shall also, in the event
that consumable supplies of the Contractor are purchased by the 197
IPA, include the purchase prices thereof as herein provided." 198

1.6 Pages E1-15 Through E1-19: The following 201
Subarticles are added to Article 19:

"19.3 Special Terms of Payment for Erection of 203
Boiler Units:

"19.3.1 Erection Contract Price of a Boiler 205
Unit: The Erection Contract Price for a Boiler Unit (Unit) 206
shall be the price quoted for that Unit and the prices quoted 207
for all of Options Relating to Erection of the Boiler Units,
except the Option to Erect Plasma Torch Direct Ignition Systems, 208
exercised for that Unit.

"19.3.2 Special Terms of Payment for All Boiler 210
Units: For the purpose of payment for erection of a Unit, the 211
Erection Contract Price of that Unit will be made as follows: 212

"19.3.2.1 Payment for Erection Prior to Price 214
Adjustment: Prior to starting erection of a Boiler Unit, the 215
Contractor shall furnish a schedule showing the breakdown, by 216
identifiable milestones, of the portion of the Erection Contract
Price of that Boiler Unit attributable to each segment of the 217
work. This schedule shall be submitted to the Engineer for 218
review and approval as representative of the actual progress of 219
the work. At the end of each calendar month during which 220
erection labor is performed, the Contractor shall furnish to the 221
IPA a duly certified estimate of the percentage of the total
amount of erection labor performed during such calendar month on 222
each Unit stated separately, hereafter referred to as the 223
Progress Estimate. The Progress Estimate shall be approved by 224
the Engineer. The IPA will pay 95 percent of the amount of each 225
approved monthly Progress Estimate for erection within 30 226

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calendar days after receipt by the IPA of such Progress Estimate.

"19.3.2.2 Final Payment: The IPA will pay the retained 5 percent of the Erection Contract Price of a Unit within 30 calendar days after Acceptance of the Unit. 220 230

"19.3.3 Special Terms of Payment for Erection of a Plasma Torch Direct Ignition System (PTDIS) Prior to Price Adjustment: 233 235

"19.3.3.1 Boiler Unit 1: Payment for the PTDIS for Boiler Unit 1 will be made in accordance with Subarticle 19.1.4.1 of Division E1. 236

"19.3.3.2 Boiler Units 2, 3, and 4: Payment for a PTDIS for Boiler Units 2, 3, or 4 will be made within 30 calendar days after complete installation of a PTDIS or receipt of the invoice therefor, whichever occurs later. 241 242

"19.4 Price Adjustment Clause: 244

"19.4.1 Boiler Units: The Erection Contract Price of a Unit shall be adjusted as specified herein. For the purpose of this price adjustment provision only, the amount representing erection price is fixed at 100 percent of the Base Erection Contract Price. The adjustable portion of the Base Erection Contract Price shall be based on the Nine Western State Boilermaker Field Agreement for boilermaker journeyman. The Base Field Labor Index shall be \$22.112, which is the boilermaker journeyman's total hourly rate in effect February 2, 1981, and which includes (a) a direct hourly rate of \$14.31 for wages, (b) an indirect hourly rate of \$6.34 for other labor costs, such as workmen's subsistence (travel) expense, contributions to funds for pensions, health and welfare, apprenticeship and vacations, etc., and (c) \$1.462 for FICA, and State and Federal Unemployment Insurance. Workers' Compensation and Public Liability Insurance are not included in the Base Field Labor Index of \$22.112 as such insurance will be provided by the IPA. The Field Labor Index shall be determined as the arithmetical average of the boilermaker journeyman's total hourly rate in effect on the first day of each month, from the month in which the work begins until the month in which the work is to be completed as specified in the Contract Schedule, as amended by any time extensions under the contract. 247 248 249 250 252 253 254 255 257 258 259 260 261

"If the Field Labor Index varies from the Base Field Labor Index, the Contractor shall submit to the IPA a 262 264

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separate invoice or credit memorandum showing the calculations and the Indexes used for the amount of such adjustment.	265
"The amount of the adjustment will be verified by the IPA. If payment is due the Contractor, payment of 95 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days after receipt of the invoice. Payment of the retained 5 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days of Acceptance of that Boiler Unit. If credit is due the IPA, a refund of 95 percent of the credit memorandum amount of the adjustment shall be made by the Contractor within 30 calendar days and the remaining 5 percent applied as credit to the final payment for that Boiler Unit.	267 268 269 270 271 272 273 274
<u>"19.4.2 Plasma Torch Direct Ignition System:</u> The erection contract prices for the PTDIS for Boiler Units 1, 2, 3, and 4 will be adjusted according to the Base Field Labor Index in Subarticle 19.4 of this Division. For the purpose of this price adjustment provision only, the amount representing erection price is fixed at 100 percent of the price of a PTDIS.	277 278 279 280
"The Field Labor Index shall be determined as the arithmetical average of the boilermaker journeyman's total hourly rate in effect on the first day of each month, from the month in which the work on a PTDIS for a Boiler Unit begins until the month in which the work on the PTDIS for that Boiler Unit is to be completed as specified in the Contract Schedule, as amended by any time extensions under the contract.	282 283 284 285
"If the Field Labor Index varies from the Base Field Labor Index, the Contractor shall submit to the IPA a separate invoice or credit memorandum showing the calculations and the Indexes used for the amount of such adjustment.	287 288
"The amount of the adjustment will be verified by the IPA. Upon complete installation of a PTDIS for a Boiler Unit, payment of 95 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days after receipt of the invoice. Payment of the retained 5 percent of the invoice amount of the adjustment will be made by the IPA within 30 calendar days of Acceptance of that Boiler Unit. If credit is due the IPA, a refund of 95 percent of the credit memorandum amount of the adjustment shall be made by the Contractor within 30 calendar days and the remaining 5 percent applied as credit to the final payment for that Boiler Unit."	290 291 292 293 295 296 297

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1.7 Page E1-21: Subarticle 22.1 is replaced with the following: 300

"22.1 General Guarantee: The Contractor shall 303
guarantee until 2 years after Acceptance of a Boiler Unit that
all design, equipment, materials, and workmanship of that Boiler 304
Unit shall be free from defects. The Contractor, at his option, 305
shall modify, adjust, repair, or replace all such defective 306
equipment, materials, or workmanship in place and use at his own
expense on a straight-time basis. The Project Manager will 307
remove and replace all peripheral equipment or facilities
necessary to provide the Contractor access to the Boiler Units 308
for corrective work at the Contractor's sole expense on a
straight-time basis. If, after Acceptance, the Boiler Unit is 309
not available for normal operation due to any failure to meet
the guarantee requirements, such time of forced outage shall not 311
be counted as part of the 2-year general guarantee period.
Additionally, the Contractor shall guarantee that each Boiler 312
Unit shall achieve 92 percent operational testing for each month 313
of the guarantee period. If during any month of the guarantee 314
period operational testing is less than 92 percent, that month
shall not be credited toward the 24-month guarantee period; in 315
such event, the guarantee period shall be extended as required 316
to obtain 24 calendar months of 92 percent operational testing.

"Operational testing shall refer to the ratio, 318
expressed as a percentage, of the number of hours during a month 319
in which the equipment is capable of a main steam flow of 6.6
million lbs/hr, with other corresponding conditions as specified 320
in Article 2 of Division G3 of these specifications, divided by
the total hours in the monthly period. During operational 322
testing, equipment will be operated and maintained by IPA in
accordance with procedures in the Contractor's Operating 323
Instructions, as mutually agreed to, and the advice of the
Contractor's Service representative.

"Each Boiler Unit shall be determined to be capable 325
of operation when the following conditions are met:

"(a) Contractor's equipment is available to 327
operate or is undergoing inspection or preventive maintenance 328
while balance of plant equipment is undergoing repair; and
maintenance or inspection not being mandatory prior to 329
restarting boiler unit.

"(b) A minimum of 6 pulverizers are in 331
operation or available for operation when using all specified 332

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coals except the blend of Coal Reserves B and F which may
require 7 pulverizers in operation. 333

"The optional extension of the guarantee period to 335
provide 24 months of 92 percent "operational testing" during the 336
guarantee period represents the exclusive liability for the
"operational testing" of each unit. No other guarantee is made 338
or shall be implied as to the availability of the unit."

1.8 Page E1-23: Article 25 is replaced with the 341
following:

"25. Termination for Breach: 344

"25.1 If the work to be done under this contract 346
shall be abandoned by the Contractor, or if the Contractor shall 347
be adjudged a bankrupt, or shall make a general assignment for
the benefit of creditors, or if a receiver of his property or 348
business be appointed by a court of competent jurisdiction, or 349
if this contract shall be assigned by him otherwise than as
herein specified, or if at any time the Project Director shall 350
determine that the performance of the Contractor is
unnecessarily or unreasonably delayed, or that the Contractor is 351
negligently or wilfully violating any of the covenants or 352
conditions of the contract, or is executing the same in bad
faith or not in accordance with the terms thereof, or refused or 354
fails to prosecute the work or any separable part thereof with
such diligence as will insure its completion within the time 355
specified, or any extension thereof, or fails to complete the 356
work within such time, the Project Director may in writing
notify and instruct the Contractor to discontinue all work, or 357
any part thereof under this contract.

"25.2 When such written notice is served upon the 360
Contractor, as provided in Article 2 of Division E1, he shall 361
immediately discontinue the work or such part thereof as is
covered by the notice, and shall not resume the same except by 362
written instructions from the Project Director. In any such 363
case the IPA may take charge of the work and complete it by a
new contract. In so doing, the IPA may take possession of and 364
use any of the materials, plant, tools, equipment, supplies, and 365
property of every kind provided by the Contractor for the
purposes of his work. The IPA may procure other materials and 366
provide labor for the completion of the same, or contract 367
therefor, and charge the expense of completion by either method
to the Contractor. These charges shall be deducted from such 368
moneys as may be due or may at any time hereafter become due the 369
Contractor under and by virtue of this contract, or any part

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thereof. In case such expense shall exceed the amount which 370
would have been due the Contractor under the contract if the 371
same had been completed by him, he shall pay the amount of such
excess to the IPA; and in case such expense shall be less than 372
the amount which would have been payable under this contract if 373
the same had been completed by the Contractor, he shall have no 374
claim to the difference except to such extent as may be
necessary, in the opinion of the Engineer, to reimburse the 375
Contractor or the Contractor's sureties for any expense properly
incurred for plant, camp, equipment, materials, supplies and 376
labor devoted to the prosecution of the work, of which the IPA 377
shall have received the benefit and which shall not have been 378
otherwise paid for by the IPA. In computing such expense, so 379
far as it shall relate to plant and equipment taken over by the
IPA, the salvage value of such plant and equipment, at 380
completion of the work, shall be deducted from the depreciated 381
value thereof at the time taken over by the IPA, and the
difference shall be considered as an expense. Evidence of such 382
expense, satisfactory to the Engineer, shall be required, and 383
all necessary estimates and appraisements shall be made by him. 384
When any particular part of the work is being carried on by the 385
IPA, by contract or otherwise, under the provisions of this 386
Article, the Contractor shall continue the remainder of the work
in conformity with the terms of his contract, and in such manner 387
as in nowise to hinder or interfere with the persons or workmen 388
employed as above provided, by the IPA, by contract or
otherwise, to do any part of the work, or to complete the same 389
under the provisions of this Article.

"25.3 As an alternative to be exercised solely by 391
the IPA for any of the reasons or conditions set forth in 392
Subarticle 25.1, supra, but in lieu of the notice to discontinue 393
all work, or any part thereof, under the contract, the IPA may
in writing notify the Contractor and his surety of its intention 394
to terminate the contract. Unless within 10 days after the 395
serving of such notices, such condition shall cease or 396
correction thereof be made, the contract shall cease and
terminate. The surety may, during said 10 days, give written 397
notice to the IPA of its election to take over and perform said 398
contract. Performance by the surety must be substantially 399
commenced and diligently prosecuted within 5 days after the 400
expiration of said 10-day period, otherwise the IPA may take
charge of the work and complete it as provided in Subarticle 401
25.1, supra, at the expense of the Contractor. In either event 402
he and his surety shall be liable to the IPA for the cost
occasioned thereby."

1.9 Page E1-25: Article 33 is replaced with the 405
following:

"33. Protection of Work and of Persons and 407
Property: During performance of the work and up to the date of 408
first firing of each Boiler Unit, the Contractor shall be under 409
an absolute obligation to protect the finished and unfinished
work against damage, loss or injury; and, in the event of such 410
damage, loss or injury, he shall, with due diligence and 411
dispatch, replace or repair such work, whichever the Engineer
shall determine to be preferable. Notwithstanding the 413
obligations of this provision, the Contractor shall retain its
rights of recovery under the Builders Risk Policy provided by 414
the OCP specified in Subarticle 1.10 of this Division. The 415
obligation to deliver finished work in strict accordance with
the contract prior to such completion shall be absolute and 416
shall not be affected by the Engineer's approval of or failure
to prohibit means and methods of construction used by the 417
Contractor.

"The Contractor must take all reasonable 418
precautions to protect the persons and property of others on or 420
adjacent to the site from damage, loss or injury resulting from
his operations under this contract, except such property as the 421
owners thereof may themselves be under a legal duty to protect. 422
This duty to protect shall include the duty to provide, place 423
and adequately maintain at or about the site suitable and 424
sufficient guards, lights, barricades and enclosures.

"Within 3 days after notice to him of the happening 426
of any such damage, loss or injury, the Contractor shall make a 427
full and complete report thereof in writing to the Engineer.

"The provisions of this Article shall not be deemed 429
to create any new right of action in favor of third parties 430
against the Contractor, any subcontractor, the IPA, or the
Project Manager."

1.10 Pages E1-26 Through E1-28: The following 433
paragraphs are added to Article 35:

"The IPA will furnish certain primary insurance 435
coverages by providing an Owner Controlled Insurance Program
(hereinafter referred to as OCP), for the benefit of all onsite 436
Contractors and subcontractors of all tiers who have jobsite 437
employees. The OCP will consist of the following types of 438
insurance with all contractors and subcontractors named as
insureds:

"(a) Workers' Compensation and Employer's Liability: 441
The Workers' Compensation insurance will conform to the laws of 443
the State of Utah. The Workers' Compensation insurance will 444
include a U. S. Longshoremen and Harbor Workers Act Endorsement, 445
an All States Endorsement, and the Voluntary Compensation 446
Endorsement. Employer's Liability insurance will have a limit 447
of \$1,000,000.00. The Workers' Compensation policy will be 448
primary insurance and noncontributing with respect to persons
directly engaged in performance of work on the jobsite.

"(b) Comprehensive General Liability: The 451
Comprehensive General Liability insurance (excluding Automobile 452
Liability) will provide bodily injury, personal injury, and
property damage liability coverage, subject to a combined single 454
limit of \$1,000,000.00 per named insured. The coverage will
include Blanket Contractual, Contractors' Protective, Products 455
and Completed Operations including Broad Form Property Damage 456
and will have no XCU exclusions. The Completed Operations
coverage will remain in force for a period of 2 years, following 457
final acceptance of the work under this contract.

"Annual aggregate limits of \$1,000,000.00 will 459
apply where applicable to each contractor and subcontractor.

"The Comprehensive General Liability policy will be 461
primary insurance and noncontributing with any other insurance 462
carried by the Contractor or any of his subcontractors.

"(c) Excess Liability: The Excess Liability 465
insurance (excluding Automobile Liability) will provide bodily
injury, personal injury, and property damage liability, subject 466
to a combined single limit of \$50,000,000.00 per occurrence and 467
annual aggregate for all contractors and subcontractors. Such 468
insurance shall be noncontributing with any other insurance
carried by the Contractor or any of his subcontractors.

"(d) Certificates and Policies: The Contractor 471
and his subcontractors will be named insureds on the insurance
provided by the OCP. Prior to the time that work is performed 472
at the jobsite, the insurer will issue certificates of
Comprehensive General Liability and Excess Liability (excluding 473
Automobile Liability) insurance to the Contractor and his
subcontractors covering the liabilities of the Contractor or 474
subcontractors, except as otherwise provided in this policy, 475
arising out of injury, loss or damage suffered or incurred at
the jobsite and injury, loss or damage occurring elsewhere 476
resulting from operations, activities, incidents or occurrences
at the jobsite. The insurer will also issue a Workers' 477

Compensation policy in the name of each contractor and subcontractor.

"Inclusion of more than one insured under such insurance shall not operate to impair the rights of one insured against another insured, and the coverages and limits afforded by such insurance shall apply as though a separate policy had been issued to each insured. It shall also be a provision of this contract that the insurer shall have no rights of subrogation to any of the named insureds or their associated and/or affiliated companies and/or their subcontractors.

"(e) Premiums: The Contractor or his subcontractor shall not by reason of their inclusion under the insurance provided for by the OCP incur any liability for payment of premium for the OCP insurance. In consideration of the IPA's payment of premium for such insurance, the Contractor and his subcontractors shall assign to the IPA all return premiums, premium refunds, dividends, refunds, discounts or other credits and any other monies due or to become due to it in connection with such insurance. The Contractor and his subcontractors shall execute such other agreements and documents, if any, which may be necessary to give effect to this assignment.

"(f) Builder's Risk: The IPA will provide "All Risk" Builder's Risk insurance with a limit sufficient to cover values at risk in transit and/or at the jobsite and subject to deductibles to be determined by the IPA. The first \$5,000.00 of any loss under this insurance shall be for the account of the Contractor or his subcontractor.

"Coverage will be provided for property in transit and at the jobsite intending for building, erection, assembly and/or installation. THE POLICY WILL NOT COVER EITHER LEASED PROPERTY OR CONSTRUCTION TYPE TOOLS, EQUIPMENT AND MACHINERY USED FOR CONSTRUCTION AND NOT INTENDED TO FORM A PERMANENT PART OF THE WORK.

"(g) Subcontracts: The Contractor shall notify the Project Director of the execution of any subcontract with each subcontractor and upon such notice, the subcontractor will be notified by the Project Director of the subcontractor's inclusion in the insurance set forth in Subarticles a, b, c, and f above. At the time of execution of each subcontract and as a condition precedent to the subcontractor's and/or the IPA's duty to perform, the subcontractor shall furnish the Project Director a completed application for insurance.

"(n) Inspection of Policies and Exclusion of Costs: 513
Copies of the policies affording the coverages described in 515
Subarticles a, b, c, and f above will be available for review at 516
the IPA's offices at the jobsite and at the Project Manager's
office.

"The Contractor and his subcontractor's contract 518
prices shall exclude all costs of insurances related to the 519
coverages described and provided by the IPA. Should the 520
Contractor or any subcontractor maintain his own insurance, the
cost shall not be reimbursed by the Contractor and will not be 521
reimbursed by the IPA.

"(i) Termination of IPA-Furnished Insurance: The 524
IPA reserves the option to terminate the OCP or any part
thereof. The IPA will give the Contractor and each insured 525
subcontractor 30 days advance notice prior to exercising this 526
option to terminate such insurance and thereafter the Contractor
and each subcontractor shall obtain during the duration of his 527
work replacement insurance comparable to that which was 528
terminated. The reasonable cost of such replacement insurance 529
will be reimbursed by the IPA. The Contractor and 530
subcontractors shall provide the Project Manager with evidence
of such insurance.

"(j) Liability and Obligations: The insurance 533
coverages provided by the IPA at its election for the Contractor
and his subcontractors are not intended to and shall not in any 534
manner limit or qualify the liabilities and obligations assumed 535
by the Contractor and his subcontractors under this contract.

"(k) Cooperation with Insurers: The Contractor 538
and his subcontractors shall cooperate with the OCP insurers.
An insurance manual outlining the OCP will be furnished in 539
connection with this contract. The Contractor and his 540
subcontractors shall complete application forms and payroll
audit forms and shall follow procedures as outlined in the 541
insurance manual. Insurers of the OCP will provide the services 542
of a safety staff to the IPA and the Contractor and his
subcontractors. The Contractor and his subcontractors shall 543
give full cooperation to the safety and/or loss control staff
assigned by the IPA or Project Manager and the insurance 544
company."

1.11 Page E1-28: The following paragraph is added to 547
Article 36:

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"For any work performed by the Contractor's or subcontractor's employees at the plant site, the Contractor shall comply with all of the provisions of (a) safe place statutes or similar provisions pertaining to the work place or safety, (b) the Workers' Compensation Insurance and Safety Acts of the State of Utah, (c) Utah Code and Industrial Commission of Utah, Safety Division, Boiler and Pressure Vessel Rules and Regulations, and (d) all similar Utah or Federal Acts or laws applicable and in effect on February 2, 1981, and the Contractor shall also defend at his own cost and indemnify and hold harmless IPA, its officers, agents, employees, assignees, and successors in interest from and against any and all liability damages, costs, losses, claims, demands, actions, causes of action, attorney's fees and expenses, or any of them, presented, brought or recovered against the IPA or which may be incurred by the IPA as a result of the Contractor's performance or nonperformance of said work related to noncompliance of a, b, c, and d above.

1.12 Pages E1-28 and E1-29: Article 37 is replaced with the following:

"37. Liquidated Damages: It will be impracticable or extremely difficult to fix the actual damage that may result from any delay in completion of erection at the time agreed upon. It is, therefore, stipulated and agreed that if the erection work required for boilout covered by the contract is not completed on or before the time of completion set forth in these specifications, or within such extensions of time as may be granted, the Contractor shall pay to the IPA, or the IPA may deduct from any moneys due the Contractor, the sum of \$500,000.00 per calendar week as agreed fixed and liquidated damages and not as a penalty for each full calendar week subsequent to the agreed date of completion during which any part of such erection work stipulated under the contract remains uncompleted; provided, however, that (a) liquidated damages shall not be due or payable for the first 10 calendar days delay in completion of erection of a Unit, that (b) payment of liquidated damages hereunder shall not be due or payable for delay in completion of such erection of a Unit if IPA would not have been able to perform boilout on a Unit notwithstanding such delayed completion of such erection, that (c) payment of liquidated damages shall not be due or payable for delay in completion of such erection of parts of a Unit that do not delay boilout of such Unit, and that (d) payment of liquidated damages hereunder shall in no event exceed \$14,000,000.00 for Unit 1, \$12,000,000.00 for Unit 2, \$10,000,000.00 for Unit 3, and \$8,000,000.00 for Unit 4.

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~~"No liquidated damages shall apply for delays in delivery, pursuant to Article 4 of Division E1, of items supplied by subcontractors (not affiliated with the Contractor) of major accessory equipment provided the Contractor has given notice, of the potential for such delay, to the Project Director.~~

~~"IPA agrees that the payment of liquidated damages shall constitute the sole and exclusive liability of the Contractor, and the sole and exclusive remedy of IPA for late completion of erection of a Unit."~~

1.13 Page E1-20: The following sentence is added to Article 38:

"The Contractor shall pay all applicable sales, use, or excise taxes assessed against his equipment, materials, supplies, or property used in connection with erection of the Boiler Units. The IPA will pay any increased, additional, or both increased and additional taxes levied in the State of Utah after February 2, 1981."

2. Labor Laws: The Contractor, his agents and employees shall be bound by and comply with all applicable provisions of Federal, State, and local laws which affect the conduct of the work.

3. Contractor's Presence at Site: The Contractor, or an experienced superintendent authorized to act for him, shall be continually in charge of the work. Information given by the Engineer to the Contractor's superintendent or his authorized representative shall be as binding as though given to the Contractor in person. In addition, there shall be a qualified and experienced foreman in charge of each branch of the work. No workman, foreman, or superintendent shall be continued on the work who is not conducting the work in a satisfactory manner to the Engineer or who acts with willful misconduct.

4. Ordinances, Codes, Permits and Licenses: The Contractor shall give all notices necessary in connection with the performance of the contract. The Contractor shall comply with all laws, ordinances, rules, regulations and codes relating to the work, use of premises and highways, and safety of persons and property. Work performed, or materials or equipment furnished, which does not conform to said laws, ordinances, rules, regulations and codes shall be changed to conform thereto by the Contractor at his own expense. The Project Manager will obtain the building permit if required. The Contractor shall

obtain, at his own expense, all other permits and all licenses, guarantees and certificates of inspection required by said laws, ordinances, rules, regulations, and codes. 621

5. Rights-of-Way: The site and rights-of-way within the plant site and storage area will be provided by the IPA. All other rights of way, ingress and egress, the right to enter, build, remove, alter, or make use of any additional area, private property, road, culvert, bridge, canal, pipeline, levee, line of communication, or improvement of whatever nature, temporary or permanent, public or private, unless otherwise provided herein, shall be secured, paid for, built and maintained by the Contractor. He shall save the IPA and the Project Manager harmless from all claims and suits occasioned by such entering, building, altering, using or trespassing. 624 625 626 627 628 629 630

6. Police and Sanitary Regulations: All police, sanitary, camp, housing, and building site regulations imposed by the Project Manager shall be fully and promptly carried out. An ample supply of water of appropriate quality and quantity shall be provided and maintained at all times. Unless facilities are available, suitable buildings shall be provided by the Contractor for the sanitary necessities of all persons employed on the work, beginning with the first person employed, in the number, manner, and places ordered. All persons connected with the work shall be obliged to use the sanitary conveniences provided. The committing of nuisances shall be rigorously prohibited. 633 634 635 637 638 640 642

7. Additional Surety: Should any surety upon the contract be deemed unsatisfactory at any time by the Project Manager, notice shall be given to the Contractor to that effect and the Contractor shall forthwith substitute a new surety or sureties satisfactory to the Project Manager. No further payment to the Contractor shall be made after said notice until the new surety or sureties shall have been accepted by the Project Manager. 645 646 647 648 649

8. Right of Property in Materials: Nothing in this contract shall be considered as vesting in the Contractor any right of property in materials used after they shall have been attached or affixed to the work or the soil but all such materials shall, upon being so attached or affixed, become the property of the IPA. 652 653 654

9. Authority of the Engineer: The Engineer will give the orders, lines, grades, and directions, as provided in the specifications: will determine the adequacy of the Contractor's 657 658

methods, plant, and appurtenances; will determine, within the limitations of these specifications, the amount, quality, acceptability, and fitness of the various kinds of work and materials which are to be paid for. Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in the specifications or drawings, the matter shall be referred to the Engineer, who will decide the matter in accordance with the true intent and meaning.

If the Contractor, at any time, fails to comply with these specifications in any substantial way, the Engineer shall have the power to order all further work stopped. Such "Stop Work" order shall be in writing only from the Engineer, and shall allow the Contractor 3 working days in which to comply with its demands. Any such work on which "Stop Work" order is issued shall be corrected to the entire satisfaction of the Engineer.

Any such interruption shall not act to relieve the Contractor of his obligation to complete the work in the stipulated number of calendar days from date of award of the contract.

10. Progress of Work: The Contractor, before commencing work under the Option to Erect Boiler Units, shall at the request of the Engineer, submit a schedule of contemplated progress covering the entire erection work of the contract, which shall include the Contractor's plan of operation with supporting data relative to starting and completion dates on the various items or phases of the work, the number of crews or shifts to be employed, proposed equipment and methods, and items which are to be concurrently constructed. Such schedule of progress will be used by the Project Director as a basis for arranging for inspection, coordination of the work of others, delivery of materials to be furnished by the Project Director, and for any other services of the Project Director required by the specifications.

The Contractor shall at all times employ such force, plant, materials and tools as will be adequate and sufficient to assure compliance with the specifications and to progress the work at such a rate as to assure completion within the time limit fixed in the contract. If the Contractor shall fail to employ sufficient and adequate force, plant, materials and tools, or to maintain adequate progress, he may be so notified by the Engineer. After such notification, he shall increase his progress at any point or modify his plans and procedure in such manner and to such extent as will meet the approval of the

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DIVISION E2

Engineer. However, the fact that the Engineer has given his approval shall not relieve the Contractor of his obligation to comply with the specifications or to complete the work within the time and for the price set forth in the contract.

11. Protests or Claims for Additional Compensation:
If the Contractor shall claim additional compensation by reason of any act or omission of the Engineer, or if the Contractor considers any work demanded of him to be outside the requirements of the contract, or if he considers the final estimate of the Engineer or any other record or ruling of the Engineer to be unfair, he shall, within 15 days after such act or omission, make a written statement to the Project Manager as to the nature of such act or omission and the amount of compensation claimed therefor. The Contractor shall furnish adequate documentation to support its claim or protest subject to audit in accordance with Article 15 of Division E1. Except for such protests and objections as are made of record in the manner and within the time above stated, the Contractor shall be deemed to have waived and does hereby waive all claims for extra work damages and extensions of time on account of demands, instructions, rulings and decisions of the Engineer.

Upon receipt of any such protest from the Contractor, the Project Manager shall review the demand, instructions, ruling or decision objected to and shall promptly advise the Contractor in writing of his final decision which shall be binding on all parties.

12. Disputes Pertaining to Payment of Work: Should any dispute arise respecting the true value of any work done, or of any work omitted, or of any extra work which the Contractor may be required to do, or respecting the size of any payment to the Contractor during the performance of this contract, said dispute shall be decided by the Project Director, whose decision shall be final.

13. Cleanup: Special attention shall be given to keeping the inside of the structures and surrounding grounds clean and free from trash and debris. The Contractor shall employ sufficient and special personnel to thoroughly clean his work areas continuously each working day and shall cooperate with the other contractors to keep the entire plant site clean. This work shall include sweeping the floors, collecting and depositing waste and trash in the areas designated by the Engineer, and all other functions required to keep the site clean. Materials and supplies shall be stored in locations which will not block accessways and shall be arranged to permit

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easy cleaning of the area. In areas where equipment might drip oil or cause other damage to the floor surface, a protective cover of heavy gage, flame-resistant, oil-proof sheeting shall be provided between the equipment and the floor surface so that no oil or grease contacts the concrete. This requirement is applicable to both finished and unfinished floors.

Promptly upon the completion of the construction work, all scrap, trash, waste materials, and debris resulting from work under this contract shall be removed to the collection areas designated by the Engineer. All Contractor-owned facilities and materials shall be removed from the site. The Contractor shall thoroughly clean the work, removing all accumulations of dust, scraps, waste, oil, grease, weld spatter, insulation, paint, and other foreign substances. Surfaces damaged by deposits of insulation, concrete, paint, weld metal, or other adhering materials shall be restored by the Contractor.

In the event of conflict between the Contractor and other contractors concerning cleaning responsibilities, the Engineer will determine the responsibility and assign the work. The Engineer's decision will be final and binding. In the event that the Contractor fails to comply with the cleanliness requirements specified herein or to perform the cleanup work assigned to Contractor by the Engineer, the IPA shall have the right to hire another contractor to perform the necessary cleaning work at the Contractor's own expense.

14. Erection Conditions: The Contract Price and time of completion is based on a single-shift, 40-hour week of either five 8-hour straight-time workdays or four 10-hour straight-time workdays, exclusive of Saturday, Sunday, and holidays. Should the actual erection work be performed on any other basis by reason of acts of the IPA, the Project Manager, or other contractors, which acts are not excused under Article 4 of Division F1 or provided for in Article 15 of Division E1, both the time of completion and the price of erection work shall be adjusted to reflect the resulting changes in cost and schedule. All overtime premium and inefficiency costs shall be for the IPA's account unless worked for the Contractor's convenience. Such adjustments shall be made by mutual agreement between the IPA and the Contractor.

Any hours in excess of the normal workday or any work on Saturdays, Sundays, or holidays, shall be considered overtime work and shall not be performed without a written order from the Engineer in accordance with Article 11 of Division E1. The

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overtime rates for the workmen will be in accordance with prevailing local agreements.

All overtime for erection supervisors shall be paid 765
for by the IPA as an addition to the Contract Price. This shall 766
be 1-1/2 times the base rate in effect at the time of
performance of the work.

15. Project Labor Agreement: The Contractor shall be 760
signatory to any project labor agreement.

PART D - DIVISION D1 15
THE CONTRACT DOCUMENTS 17

1. General: The documents listed in the Table of Contents herein shall constitute the contract. Said documents are complementary and intended to require a complete and finished piece of work. Anything shown or required of the Contractor, in any one or more of said documents, shall be as binding as if contained in all of said documents. The Contractor shall not be allowed to take advantage of any error, discrepancy or omission in any document, but shall promptly report to the Engineer, in writing, any such matter discovered. The Engineer will then decide or correct the same, and his decision shall be final. 21 22 23 25 26 27

2. Drawings and Letter of Credit: The following complementary documents are a part of the contract: 30

DRAWINGS 33

SL-MD53* 35
SL-MD54* 36
SL-MD55* 37
SL-MD56* 38
SL-MD57* 39
SL-MD58* 40
SL-MD59* 41
SL-MD60* 42
SL-MD61* 43
SL-MD62* 44
SL-MD63* 45
MDC-56-94-80* - *Line Diagram* 46
SL-MDR302* - *Prelim General Contract.* 47

EXHIBITS 49

A* LETTER OF CREDIT (2 pages) 51
B* BAFFLE WALL SCREEN 53
C* REAR SCREEN & CPFW 55

Note: The asterisk (*) following a document number indicates that the document is attached to these specifications. 57 58

PART E - DIVISION D2 16

SUPPLEMENTARY CONTRACT DOCUMENTS 18
FOR OPTION TO ERECT BOILER UNITS 19

1. Modification to the Contract Documents: If the 23
Option to Erect Boiler Units is exercised under Subarticle 5.1
of the Execution Document, The Contract Documents (Division D1) 24
are modified as follows:

1.1 Page D1-1: Article 1 is replaced with the 27
following:

"1. General: The documents listed in the Table of 30
Contents herein shall constitute the contract. Said documents 31
are complementary and intended to require a complete and
finished piece of work including the furnishing of all labor, 32
tools, plant equipment, scaffolding, shoring, protection work,
watchmen, superintendents, transportation, permits, bonds, 33
insurance and material, except such as are clearly specified in
said documents to be supplied by the IPA. Anything shown or 35
required of the Contractor, in any one or more of said
documents, shall be as binding as if contained in all of said 36
documents. The Contractor shall not be allowed to take 37
advantage of any error, discrepancy or omission in any document,
but shall promptly report to the Engineer, in writing, any such 38
matter discovered. The Engineer will then decide or correct the 39
same, and his decision shall be final."

PART D - DIVISION D1 15
THE CONTRACT DOCUMENTS 17

1. General: The documents listed in the Table of Contents herein shall constitute the contract. Said documents are complementary and intended to require a complete and finished piece of work. Anything shown or required of the Contractor, in any one or more of said documents, shall be as binding as if contained in all of said documents. The Contractor shall not be allowed to take advantage of any error, discrepancy or omission in any document, but shall promptly report to the Engineer, in writing, any such matter discovered. The Engineer will then decide or correct the same, and his decision shall be final. 21 22 23 25 26 27

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SL-MD54* 36
SL-MD55* 37
SL-MD56* 38
SL-MD57* 39
SL-MD58* 40
SL-MD59* 41
SL-MD60* 42
SL-MD61* 43
SL-MD62* 44
SL-MD63* 45
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PART C - DIVISION D2

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SUPPLEMENTARY CONTRACT DOCUMENTS
FOR OPTION TO ERECT BOILER UNITS

18

19

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Option to Erect Boiler Units is exercised under Subarticle 5.1
of the Execution Document, The Contract Documents (Division D1) 24
are modified as follows:

1.1 Page D1-1: Article 1 is replaced with the 27
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Contents herein shall constitute the contract. Said documents 31
are complementary and intended to require a complete and 32
finished piece of work including the furnishing of all labor,
tools, plant equipment, scaffolding, shoring, protection work,
watchmen, superintendents, transportation, permits, bonds, 33
insurance and material, except such as are clearly specified in
said documents to be supplied by the IPA. Anything shown or 35
required of the Contractor, in any one or more of said
documents, shall be as binding as if contained in all of said 36
documents. The Contractor shall not be allowed to take 37
advantage of any error, discrepancy or omission in any document,
but shall promptly report to the Engineer, in writing, any such 38
matter discovered. The Engineer will then decide or correct the 39
same, and his decision shall be final."

PART F - GENERAL SPECIFICATIONS 15

DIVISION F1 - SPECIAL CONDITIONS 17

1. Scope of Work: Under the terms of the contract, 21
the Contractor shall furnish and deliver Boiler Units for 22
Intermountain Power Project, Units 1, 2, 3, and 4.

2. Delivery: 24

2.1 Materials and Equipment: Materials and equipment 27
for each Boiler Unit shall be delivered to the plant site in
accordance with the following erection schedule:

	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	
Start of structural steel erection not later than	12-1-82	12-1-83	12-1-84	12-1-85	33 34
Begin lift of steam drum not later than	10-1-83	10-1-84	10-1-85	10-1-86	36 37
Ready for hydrostatic test not later than	9-1-85	9-1-86	9-1-87	9-1-88	39 40
Ready for boilout not later than	12-1-85	12-1-86	12-1-87	12-1-88	42 43
Ready to generate steam not later than	1-1-86	1-1-87	1-1-88	1-1-89	45 46
Ready to generate steam at Maximum Capacity not later than	2-1-86	2-1-87	2-1-88	2-1-89	48 49 50
Erected complete in accor- dance with the contract and ready for operating tests not later than	3-1-86	3-1-87	3-1-88	3-1-89	52 53 54 55

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The following Key Items shall be delivered not sooner than 45 calendar days prior to the following dates and not later than the following dates:

<u>Key Items</u>	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	
Steam Drum	9-16-83	9-16-84	9-16-85	9-16-86	66
Penthouse Headers	11-11-83	11-11-84	11-11-85	11-11-86	68
Upper Furnace Buckstays	11-11-83	11-11-84	11-11-85	11-11-86	70
Intermediate Furnace Buckstays	11-25-83	11-25-84	11-25-85	11-25-86	72 73
Upper Wall Panels	12-9-83	12-9-84	12-9-85	12-9-86	75
Lower Furnace Buckstays	12-9-83	12-9-84	12-9-85	12-9-86	77
Burners	12-9-83	12-9-84	12-9-85	12-9-86	79
Burner Piping	12-9-83	12-9-84	12-9-85	12-9-86	81
Horizontal Reheat Superheat and Economizer Sections	12-18-83	12-18-84	12-18-85	12-18-86	83 84
Remaining Loose Headers, Downcomers	1-6-84	1-6-85	1-6-86	1-6-87	86 87
Superheat and Reheat Pendant Sections and Roof Tubes	1-13-84	1-13-85	1-13-86	1-13-87	89 90 91
Pulverizers	2-6-84	2-6-85	2-6-86	2-6-87	93
Flues and Ducts	4-13-84	4-13-85	4-13-86	4-13-87	95

2.2 Spare Parts and Pulverizer Replacement Parts: 99
All spare parts and pulverizer replacement parts shall be delivered on a mutually agreed schedule. 100

3. Options: Any options will be exercised by the issuance and delivery to the Contractor of an order therefor by the Project Manager or his duly authorized representatives. If any option is exercised, the Contractor shall furnish a faithful performance bond and a labor and material payment bond, each 104
105
106
107

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such bond in an amount equal to 50 percent of the full amount of such option.

4. Contractor's Meeting: A meeting will be held at a location designated by the Project Director at which time the Contractor shall meet with the Project Director and management and design representatives of the IPA. The meeting will be held not sooner than 150 calendar days and not later than 210 calendar days after the effective date of contract. The meeting will consist of a discussion of job progress and boiler design.

The Project Director may also hold, at approximately 3-month intervals and at locations designated by the Project Director, additional job progress and boiler design meetings with the Contractor.

The Contractor's Chief Executive Officer in charge of the design and construction divisions for the Boiler Units shall attend the meetings.

5. Letters to the Project Manager: All letters pertaining to this contract, except those letters pertaining to invoices, packing lists, and bills of lading, written to the IPA after the effective date of contract shall show the contract number and title and shall be addressed as follows:

Mr. J. H. Anthony
Intermountain Power Project Director, Room 931
Los Angeles Department of Water and Power
P. O. Box 111
Los Angeles, California 90051

Re: Contract 2010N
Boiler Units for Intermountain
Power Project, Units 1, 2, 3, and 4

(a) All letters pertaining to invoices shall be addressed in accordance with Article 18 of Division E1.

(b) All letters pertaining to packing lists and bills of lading shall be addressed in accordance with Article 13 of Division E1.

6. Contractor's Drawings: Drawings shall be submitted in accordance with the following schedule:

6.1 List of Drawings: Within 75 calendar days after the effective date of contract, the Contractor shall submit to the Engineer for approval a list of the drawings which he

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proposes to submit for approval, setting forth descriptive titles, the expected date on which each drawing will be submitted, and, if possible, drawing numbers. The list shall be revised and extended as necessary during the progress of the work. 152 154

6.2 Drawings to be Furnished: 156

6.2.1 Drawings to be furnished within 60 calendar days after the effective date of contract shall show: 158

(a) General arrangement of plan, rear, side, and front elevations showing locations of all access openings and soot blowers, and key plan. 160 161

(b) Outside boiler dimensions, expansion requirements, clearance and preliminary access requirements, location of columns and configuration of boiler support grid, seismic tie attachment points, preliminary weights, forces, and moments to be transmitted to the structural framing, and all other pertinent information that will enable the IPA to proceed with the layout of the structural steel frame. 163 164 165 166 167

6.2.1.1 Drawings to be furnished within 90 calendar days after the effective date of contract shall show: 169

(a) Final access requirements, the magnitude, direction, and location of the forces at the points of attachment of hangers and seismic ties, reaction forces of safety valves, and all other pertinent information that will enable the IPA engineers to proceed with the design of the structural steel frame. 171 172 173 174

(b) The weights and locations of all major equipment furnished by the Contractor and information required for location of platforms. 176 177

(c) Structural steel final design drawings of all structural steel supports which are to be attached directly to the main structural frame or foundation to be furnished by IPA. These drawings shall be signed by a Civil or Structural Engineer registered in the State of Utah. 179 180 181

6.2.2 Drawings to be furnished within 150 calendar days after the effective date of contract shall show: 183

(a) Data for all motors as follows: 185

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(1) Motor information including the name of manufacturer, catalog designation, intended use, and the nameplate markings, in accordance with NEMA MG1, Part 10, as last revised.	187 188
(2) Number and rating of heaters in each motor.	190
(3) Additional data to be furnished for vertical motors:	192
[a] Manufacturer and catalog number of thrust bearing.	194
[b] Manufacturer and catalog number of guide bearing.	196
[c] Load on thrust bearing at design point.	198
[d] Actual maximum downthrust load on thrust bearing during operation of pumps.	200
[e] Manufacturer's downthrust rating of thrust bearing.	202
[f] Maximum momentary upthrust on thrust bearing.	204
[g] Manufacturer's momentary upthrust rating of thrust bearing.	206
(h) Superheater, reheater, and economizer header connections and tube material and thickness for each section.	208 209
(i) Air and flue gas ducts.	211
(j) Air heaters.	213
(k) Coal feeders and pulverizers.	215
6.2.3 Drawings to be furnished within 180 calendar days after the effective date of contract shall show:	217
(a) Deleted.	219
(b) Deleted.	221
(c) Pressure and temperature of the fluid in all drums and headers for the Boiler Unit at Maximum Capacity.	223 224

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(d) Temperature of flue gas entering and leaving each superheater, reheater, and economizer section, temperature of flue gas entering the air heater, and the corrected and uncorrected temperature of the flue gas leaving the air heater.	226 227 228
(e) Reference list of valves and accessories showing quantities, location, description, drawing numbers, service conditions, and function.	230 231
(f) Detailed arrangement of the burner front including arrangement of coal piping and recommended arrangement of ignitor and warm-up burner oil piping.	233 234
(g) The following information for the primary air fans shall be furnished:	236
(1) Location of the center of gravity of the stationary part of the fan with respect to the centerline of the shaft.	238 239
(2) Weight and weight moment of inertia of the stationary part of the fan with respect to the centerline of the shaft.	241 242
(3) Weight and weight moment of inertia of the rotating part of the fan including coupling with respect to the centerline of the shaft.	244 245
6.2.4 Drawing to be furnished within 240 calendar days after the effective date of contract shall show:	247
(a) Deleted.	249
(b) Details of all instruments and controls furnished including schematic and logic diagrams, drawings of outline dimensions and mounting requirements, and functional cutaways.	251 252
(c) Expansion movements at all boiler and equipment interface connections.	254
(d) Thermocouple arrangement and installation standards.	256
(e) Sootblower system including supports, recommended wiring, piping, and controls.	259
(f) Coal and ignitor oil systems including assembly and details, controls, and complete wiring diagrams.	260 261

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(g) Wiring diagrams of valve motor operators, showing details of terminals and auxiliary switches and including connections to remote equipment.	263 264
6.2.5 Drawings to be furnished within 300 calendar days after the effective date of contract shall show the outline dimensional drawings of all electrical equipment including all electric motors. Drawings shall also show the weight of the equipment.	266 267 268
6.2.6 All other drawings shall be furnished within 420 calendar days after the effective date of contract and shall include the following:	270 271
internals. (a) Drum detail drawings and details of all drum	273
(b) Sealing devices.	275
joints. (c) All welding procedures and details of welded	277
(d) Details of headers.	279
(e) Damper details and torque requirements.	281
(f) Access doors.	283
(g) Piping and insulation.	285
(h) Setting.	287
(i) Boiler tube arrangement drawings which shall provide, but not be limited to, the information shown on Contractor's Drawings 258954E and 231747E attached as Exhibits B and C, respectively.	289 290
6.3 General: Any combination of items listed above may be shown on a single drawing if the clarity is not thereby impaired.	293 294
Additional drawings, instructions, or information which may be requested by the Engineer for erection, operation, and maintenance of the equipment or to determine compliance with the contract shall likewise be submitted for approval.	296 297 298
It is imperative that the drawings be furnished within the time required herein, in order that the design of related facilities may be progressed on schedule.	300 301

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Transparencies shall be positive and right reading. 303
They shall not be folded and shall be sufficiently legible to 304
make 35 mm microfilm negatives which can be read clearly when 305
enlarged 14 times.

All drawings shall be accompanied by a letter of 307
transmittal and shall be submitted in such sequence that the 308
Engineer will have all of the information necessary for checking
and approving each drawing at the time it is submitted. Each 310
drawing shall be identified by a number and a descriptive title.

The drawings shall fully demonstrate that the 312
equipment to be furnished will comply with the provisions of 313
these specifications and shall furnish a true and complete 314
record of the equipment as manufactured and delivered. Approval 315
of such drawings by the Engineer will be based on compliance
with these conditions.

Within 45 calendar days after receipt of the drawings 317
for approval, one print of each will be returned to the
Contractor by letter stamped "approved", "approved with changes 318
noted", or "not approved".

If a drawing is "approved", the Contractor may proceed 320
with the work covered by the drawing. 321

If a drawing is "approved with changes noted", the 323
Contractor may proceed with the work covered by the drawing and 324
the changes noted. However, the Contractor shall promptly 325
revise the drawing in accordance with the changes noted and 326
submit a transparent copy.

If a drawing is "not approved", the Contractor shall 328
correct the drawing and resubmit a transparent copy for 329
approval. Progress of work covered by drawings marked "not 330
approved" is not authorized by the IPA.

Revised drawings shall be submitted in the same size 332
as the original submitted except when completely redrawn. 333

Approval by the Engineer of the Contractor's drawings 335
shall not relieve the Contractor of the responsibility to meet 336
all of the requirements of these specifications or of the 337
responsibility for the correctness of the drawings furnished by
the Contractor. The Contractor shall have no claim for 338
additional costs or extension of time on account of delays due 339
to revisions of the drawings which may be found necessary to
comply with the contract. In case of later discovery of error, 340
omission, or inconsistencies in the Contractor's drawings, the 341

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Contractor shall promptly submit revised transparencies to the Engineer for approval.

If the drawings contain information which does not 343
pertain to the equipment being furnished, the Contractor shall 344
either delete the information which is not applicable or plainly 345
identify the pertinent information.

6.4 Availability of Shop Drawings: All applicable 348
contract shop drawings shall be available to the Engineer at the
Contractor's and subcontractor's fabrication facilities. 349

The Contractor shall provide the Project Manager 351
detail drawings, as selected by the Project Manager for his 352
review and comment. The Project Manager will not have the right 353
of approval, but any valid questions or comments will be
addressed.

7. Contractor's Information: Information shall be 356
submitted in accordance with the following schedule:

7.1 Except for general arrangement drawings for major 358
subcontracted equipment, which shall be submitted within 150 359
calendar days after the effective date of contract, information 360
to be furnished within 180 calendar days after the effective
date of contract shall include the following:

(a) Final design information regarding the 362
magnitude, direction, and location of the forces at the points
of attachment of hangers and seismic ties, reaction of safety 363
valves, and all other pertinent information that will enable the 364
IPA engineers to proceed with the design of the structural steel 365
frame.

(b) The maximum dynamic loads resulting from the 367
imbalance of rotating equipment. The following information 368
shall be furnished for all fan units:

(1) The first critical speed of the assembled 370
unit. The critical speed is defined as that speed equal to the 371
natural frequency of the combined spring-mass system of rotor, 372
bearing housing, oil film, and bearing pedestal, but excluding
the reinforced concrete foundation.

(2) The weight and weight moment of inertia of 374
the rotor.

(3) The weight and location of the center of 376
gravity of the fan housing and of the motor.

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(4) The diameters and the bearing-to-bearing length of the shaft.	378
(5) Fan drawings indicating dimensions and total weight.	380
(6) The amplitude (Fo) and frequency (w) of the dynamic force resulting from rotor imbalance in the form $F(t) = F_o \sin wt$ such that the Engineer can predict the motion of the foundation.	382 383
(c) Complete performance data, including the following, for the Boiler Units at steam output of 100, 75, 50, and 25 percent of the steam flow at Maximum Capacity and at maximum continuous rating:	385 386
(1) Pressure and temperature of the fluid in all drums and headers.	388
(2) Pressure drop and capacity of spray desuperheaters.	390
(3) Flue gas pressure in inches of water entering and leaving:	392
[a] Furnace.	394
[b] Each superheater, reheater, and economizer section.	396
[c] Air heater.	396
(4) Temperature of flue gas entering and leaving each superheater, reheater, and economizer section.	400 401
(5) Corrected and uncorrected flue gas temperature leaving air heater.	403
(6) Flue gas rate of flow leaving air heater at corrected temperature stated above - cfm.	405
(7) Flue gas rate of flow - 10 ³ lb/hr, as follows:	403
[a] Entering air heater.	411
[b] Leaving air heater.	413

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(8) Distribution percentages of total gas flow through each superheater and reheater section if dampers are provided to control steam temperature.	415 416
(9) Excess air - percent, as follows:	418
[a] Leaving furnace.	420
[b] Leaving economizer.	422
[c] Leaving air heater.	424
(10) Air - 10 ³ lb/hr, as follows:	426
[a] Entering air heater.	428
[b] Leaving air heater.	430
(11) Air entering air heater at 80F - cfm.	432
(12) Air temperature - F, as follows:	434
[a] Entering air heater.	436
[b] Leaving air heater.	438
(13) Air pressure - inches of water, as follows:	440
[a] Loss through air heater.	442
[b] Permanent loss through air flow measuring device, dampers, and ducts.	444
[c] Required at burner windbox.	446
[d] Total required at air heater inlet.	448
(14) Heat absorbed by Boiler Unit percent.	450
(15) Heat loss, percent, due to:	452
[a] Water from combustion of hydrogen.	454
[b] Theoretical dry gas.	456
[c] Excess air and moisture contained therein, measured at the gas outlet of the air heater.	459

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[d] Moisture in theoretical air.	460
[e] Moisture in fuel.	462
[f] Radiation.	464
[g] Carbon in ash.	466
[16] Combustion gas velocity per square foot of free area - fps, as follows:	468
[a] Leaving the furnace.	470
[b] Entering the superheater.	472
[c] Entering the reheater.	474
[17] Coal consumption - pounds per hour.	476
[d] Recommended chemical treatment of boiler feedwater.	478
[e] Curves showing temperature gradient through the water and steam circuits of the boiler.	480
[f] Curves of average steam temperature, design steam temperature, average and maximum heat absorption rates, and design metal temperatures plotted against the length of superheater and reheater tubing.	482 483
[g] Sootblower system including supports, recommended wiring, piping, and controls.	485
[h] Coal and ignitor oil systems including assembly details and controls.	487
[i] Superheat and reheat temperature, combustion, and feedwater systems.	489
2.2 Information to be furnished within 240 calendar days after the effective date of contract shall include the following:	491 492
(a) Functional details of all instruments and controls furnished including all interface requirements.	494
(b) Sufficient computations to justify the design of the boiler suspension steel and those portions of the seismic supports that are attached to the IPA's frame. These	496 497 498

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computations shall be signed by the person responsible therefor, who shall be a Civil or Structural Engineer registered in the State of Utah. 499

7.3 All other information shall be furnished within 420 calendar days after the effective date of contract and shall include the following: 501 502

- (a) Drum and drum internals. 504
- (b) Sealing devices. 506
- (c) Damper details and torque requirements. 508
- (d) Piping and insulation. 510
- (e) Setting. 512

7.4 It is imperative that all information be furnished within the agreed times in order that the design of related equipment may proceed on schedule. 514 515

8. Production Location: The boiler components shall not be produced at locations or facilities different from those listed below unless written approval of the Engineer has been obtained. 518 519

Barberton Works	Canton Works	522
P.O. Box 351	1501 Ratf Road S.W.	523
Barberton, Ohio 44203	P.O. Box 3020	524
(216) 753-4511	Canton, Ohio 44710	525
	(216) 478-1441	526
West Point Works	Brunswick Works	528
Old Aberdeen Road	South Albany Street	529
P.O. Box 677 & 1297	P.O. Box 1478	530
West Point, Miss. 39773	Brunswick, Ga. 31520	531
(601) 494-1323	(912) 265-0510	532
Paris Works	Wilmington Works	534
1200 - 19th Street, S.W.	P.O. Box 1730	535
Route 5	Vance Street	536
Paris, Texas 75460	Wilmington, N.C. 28402	537
(214) 784-2571	(919) 791-9010	538

9. Contractor's Purchase Orders: The Contractor shall promptly provide to the Engineer a copy of those purchase orders requested by the Engineer. These copies of purchase orders shall be complete, showing material properties, 542 543

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quantities, items, conditions of delivery, and manufacturer name. They will be used for assisting the Engineer, and price need not be shown.

The Contractor shall notify the Engineer of any changes to purchased equipment and shall promptly provide the Engineer a copy of the corrected purchase order showing the changes.

10. Seismic Design Requirements: The following seismic design criteria shall be used in the design of all equipment, equipment components, and supports furnished by the Contractor under these specifications: 551 552

10.1 Boiler: The main boiler structure and the boiler internals shall be designed to resist the stresses resulting from operating loads plus equivalent uniform static seismic forces applied at the center of gravity of the contributory elements equal to $0.2a$ in any horizontal direction and $0.13a$ in either vertical direction times the operating weight of the contributory elements. These forces shall be combined simultaneously or used separately to produce the most severe internal stresses. The resulting stresses shall not exceed the allowable stress requirements of applicable codes and standards. No increase in allowable stress for seismic load shall be used for the design of connections and anchorage assemblies. There shall be no permanent distortion of the boiler walls or internals as a result of the application of the specified design loads, and all systems shall be functional and operable subsequent to the application of these loads. 555 556 557 558 559 560 561 562 563 564 565

10.2 Other Equipment: All other equipment and equipment cabinets furnished by the Contractor shall be designed to resist operating loads and seismic equivalent static forces applied at the center of gravity of the contributory elements equal to $0.30a$, in any horizontal direction and $0.20a$ in either vertical direction times the operating weights of the contributory elements. The above loads shall be applied simultaneously or separately and in the directions which will produce the most severe internal stresses. These stresses shall not exceed the allowable stress requirements of applicable codes and standards. All systems, equipment, and components shall be functional and operable subsequent to the application of these loadings, except that all systems, equipment, and components necessary for the safe shutdown of a Boiler Unit shall remain functional and operable during and subsequent to the application of seismic forces up to the maximum loadings specified. 568 569 570 571 572 573 574 575 576 577 578

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<u>10.3 Seismic Anchorage of Other Equipment:</u>	581
anchorage of auxiliary boiler equipment (other equipment)	
supported independently of the main Boiler Unit shall be	582
designed for the loadings described herein and the following:	
(a) Steel support frames shall be designed and	584
fabricated in accordance with the AISC Specification for the	585
Design, Fabrication, and Erection of Structural Steel for	
Building, with no increase allowed for seismic.	586
(b) Support frames and anchorage assemblies	588
including anchor bolts shall be designed for operating loads	589
plus an equivalent static seismic force applied at the center of	590
gravity of the equipment equal to 0.5 times the weight of the	
equipment in any direction using AISC allowable stresses with no	591
increase allowed for seismic.	
(c) Anchor bolts shall be not less than 9/16-inch	593
diameter and made of ductile material. Unless otherwise	595
specified in the bidder's proposal, all anchor bolts 4 inches or	
smaller in diameter shall comply with the requirements of ASTM A	596
307, Grade A.	
<u>11. Identification of Contractor's Employees:</u>	599
IPA will provide the Contractor with sufficient identification	
badges for himself and for his subcontractors, employees, and	600
representatives who will be required to enter upon the IPA's	601
construction site.	
These badges shall be worn at all times while on the	603
site and shall be displayed whenever required.	
The Contractor shall be responsible for the issuance	605
of such badges and the return of same to the IPA when any of the	606
following events transpire:	
(a) Discharge, layoff, or resignation of the	608
person to whom the badge was issued.	
(b) Completion of the contract or subcontract.	610
(c) Expiration of the time limit if badges are	612
issued for a stated period.	
<u>12. Balance:</u>	615
All rotating parts, except pulverizers,	
shall be statically and dynamically balanced by the Contractor	
at the factory so that there will be no undue or harmful	616
vibration during operation.	

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13. Shipment: All shipments shall be properly boxed, 610
crated, packed, or otherwise protected to prevent damage in 620
transit and storage. All parts shall be prepared for shipment 621
so that slings for handling can be readily attached while the 622
parts are on the car or truck. Where it is unsafe to attach 623
slings to the box, boxed parts shall be packaged with slings 624
attached to the parts so that attachments can readily be made.
Before shipment, all finished iron and steel external parts 625
shall be covered with a readily removable rust-preventing 626
compound, and all finished bright work shall be suitably wrapped 627
or otherwise protected from damage. All pipe flanges shall be 628
protected by flange protectors bolted on, plugs shall be 629
inserted into all tapped holes, and all other openings shall be
adequately protected to prevent entrance of dirt and moisture 630
during shipment.
- Each package shall be plainly marked with the 632
following:
- (a) An identifying number, which also shall appear 634
on the bill of lading and other documents relating to shipment. 635
 - (b) Name and address of consignor and Contractor. 637
 - (c) IPA's contract number and Item number. 639
 - (d) Sufficient information to identify the 641
contents, and when possible, the name of the machine or 642
equipment of which the contents form a part.
 - (e) Consignee's name and address as shown in the 644
Proposal Schedule.
 - (f) Shipping weight. 646
- Each package shall contain a detailed packing list 648
containing package and contract numbers and a description of the 649
contents, including quantities, part or unit identifications,
and part numbers, if applicable.
- Spare parts shall not be packaged with other material. 651
- All equipment delivered by truck shall be capable of 653
being unloaded from 3 sides of the truck bed with a forklift 654
loader or from above with an overhead crane. All equipment 655
delivered by rail shall be on flat cars.

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Copies of the packing lists and bills of lading shall 657
be sent to the IPA, in accordance with Article 13 of Division 658
E1, on or before the date the packages are shipped.

14. Additional Information Required by Contractor: 660
The Contractor shall make timely application for any additional 661
information which he requires and shall not proceed without 662
clear knowledge of the specifications.

15. Contractor's Project Manager: The Contractor's 665
Project Manager shall not be assigned any responsibilities other 666
than the administration of this contract. The Contractor's
Project Manager shall not be reassigned before all Boiler Units 667
have been accepted without the written approval of the Engineer.
Replacement personnel for the Contractor's Project Manager and 668
other key project and plant site personnel shall be selected 669
only after mutual agreement between the Engineer and the
Contractor and written confirmation by the Engineer. 670

16. Engineering Services Furnished by Contractor: 672
The Contractor shall furnish an adequate number of competent 673
erection and service engineers for 30 months during the erection 674
and preliminary operation period of each Boiler Unit, with such
period beginning with preparation for erection and ending when a 675
unit is complete and ready for Operating Tests.

The erection and service engineers shall report for 677
duty on the day requested provided the Engineer gives notice in 678
writing not less than 30 calendar days prior to the date such
erection and service engineers will be required. 679

The IPA will furnish suitable office space at the site 681
for the erection and service engineers.

The normal workday (or shift) of erection engineers 683
shall be 8 hours per day, Monday through Friday, exclusive of 684
holidays. Any hours expended in excess of the normal workday or 685
any work on Saturdays, Sundays, or holidays will be considered 686
overtime. All overtime authorized by the Project Manager will 687
be paid for by the IPA as an addition to the contract price.
This will be 1-1/2 times the base rate in effect at the time the 688
work is performed.

The erection engineer shall furnish instructions to 690
IPA personnel as to proper procedure for storage and handling of 691
equipment and erection of the Boiler Units; however, the
erection engineer shall not assume executive charge of such work 692
but shall provide technical direction and instructions so that 693
the IPA, to the extent that it follows the recommendations of

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the Contractor, shall be relieved of claims by the Contractor that failure is due to improper work of erection.	694
In addition to the service engineers from the Contractor's company, the Contractor shall furnish service engineers from the companies furnishing the following equipment:	696 697
(a) Air heaters.	699
(b) Soot blowers.	701
(c) Safety valves.	703
(d) Burners.	705
(e) Boiler circulation pumps, if furnished.	707
(f) Coal feeders.	709
(g) Coal pulverizers.	711
(h) Primary air fans.	713
(i) Burner management logic control system, if furnished.	715
(j) Mechanical continuous ash removal system, if furnished.	717
The service engineer shall determine that each Boiler Unit and appurtenances were properly installed and made ready to operate. The service engineer shall furnish instructions to IPA personnel as to proper procedure for installation, starting up, and initial operation of the equipment; however, the service engineer shall not assume executive charge of such work but shall provide technical direction and instructions so that the IPA, to the extent that it follows the recommendations of the Contractor, shall be relieved of claims by the Contractor that failure is due to improper work of installation. The service engineer shall also determine and report to the IPA the limits of proper operating conditions, particularly for excess air, pulverizer and burner ranges, steam temperature control ranges, maximum steam generation capability, maximum load pickup rates, and boiler water purity.	719 720 721 722 723 724 726 727 728
The Contractor shall instruct plant supervisory operating personnel on all special requirements for operating and maintaining the equipment furnished.	730 731

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17. Future Engineering Services: When requested by 734
the IPA, the Contractor shall furnish engineering services from 735
time to time for the life of the Boiler Units for services 736
related to design, repair, modification, and operation of the 737
Boiler Units. Such services shall be provided at the 738
Contractor's standard fee for engineering services or in the 739
event that the Contractor does not normally provide such
engineering services for others at a fee of cost plus 15
percent.

The services of key service engineers identified in 741
accordance with Article 15 of this Division shall be available, 742
as required, during the guarantee period of each Boiler Unit.

18. Right to Operate Unsatisfactory Equipment: If 745
the operation of the equipment after installation proves to be 746
unsatisfactory to the Engineer, the IPA shall have the right to
operate such equipment until it can be taken out of service 747
without injury to the IPA for the correction of defects, errors, 748
or omissions, provided the period of such operation pending the
correction of defects, errors, or omissions shall not exceed one 749
year without written consent of the IPA and the Contractor.

19. Cooperation of Contractor: The Contractor shall 752
cooperate with the Engineer in the design of adjacent or
connecting equipment and steel work furnished by the IPA and 753
shall provide information for this purpose as required by the
Engineer's time schedule. 754

Extra expense by the IPA caused by access requirements 756
not identified by the Contractor in accordance with Articles 6 757
and 7 of this Division shall be the sole responsibility of the
Contractor and such extra expense will be charged against the 758
Contractor.

20. Instruction Books: The Contractor shall furnish 761
3 complete identical sets of detailed instruction books for all 762
equipment furnished under these specifications. These books 763
shall be accompanied by a letter of transmittal and shall
contain all illustrations, detailed drawings, wiring diagrams, 764
and instructions necessary for installing, operating, and
maintaining the equipment. The instruction books shall also 765
contain 11-inch by 17-inch copies of all approved drawings. The 766
illustrated parts shall be numbered for identification. All 767
information contained therein shall apply specifically to the 768
equipment furnished and shall not include instructions not
applicable. Photographs, ozalids, Xerox, and similar types of 769
reproductions shall not be attached to pages. All such 770
771

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illustrations shall be incorporated within the printing of the page to form a durable and permanent reference book. 772

The instruction books shall be delivered not later than 12 months prior to the scheduled date for boilout of Boiler Unit 1. 774 775

The IPA will inform the Contractor by letter within 45 calendar days after receipt of the instruction books either that the instruction books are approved as submitted or that revisions are required. If approved, the Contractor shall promptly furnish 13 additional sets identical to the approved copy. If revisions are required, one set will be returned to the Contractor with the required revisions indicated. The required revisions shall be promptly incorporated in the instruction books, and a total of 16 complete, identical sets of such revised instruction books shall be furnished to the Engineer. Delay in delivery of the instruction books or revisions thereto will be cause for delay in acceptance of the equipment. 777 778 779 780 781 782 783 784

21. Contractor's Erection Information Packages: The Contractor shall furnish 2 complete identical sets of detailed erection information packages for the Boiler Units. These erection information packages shall be accompanied by a letter of transmittal and shall contain all illustrations and instructions necessary for the scheduling, unloading, storage, uncrating, preparing equipment for installation, cleaning, erection and assembly, welding, alignment, and checking work performed. The illustrated parts shall be numbered and indexed for identification. All information contained therein shall apply specifically to the Boiler Units furnished and shall not include instructions not applicable. Contractor's drawings submitted under Article 6 of this Division may be referred to in these erection information packages as necessary. A list of such Contractor's drawings shall be included giving the title and drawing number; copies of such drawings need not be included in these erection information packages. 787 788 789 790 791 792 793 794 796 797

Information contained in the erection information packages shall include the following: 799

- (a) Scope of work identifying termination points. 801
- (b) Breakdown of boiler parts and associated equipment with weights, specifications, and drawing references. 802 804
- (c) Bills of material for piping, instruments, hangers, clips, spacers, and anchors. 806

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PART F - GENERAL SPECIFICATIONS 15

DIVISION F1 - SPECIAL CONDITIONS 17

1. Scope of Work: Under the terms of the contract, 21
the Contractor shall furnish and deliver Boiler Units for 22
Intermountain Power Project, Units 1, 2, 3, and 4.

2. Delivery: 24

2.1 Materials and Equipment: Materials and equipment 27
for each Boiler Unit shall be delivered to the plant site in
accordance with the following erection schedule:

	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	
Start of structural steel erection not later than	12-1-82	12-1-83	12-1-84	12-1-85	33 34
Begin lift of steam drum not later than	10-1-83	10-1-84	10-1-85	10-1-86	36 37
Ready for hydrostatic test not later than	9-1-85	9-1-86	9-1-87	9-1-88	39 40
Ready for boilout not later than	12-1-85	12-1-86	12-1-87	12-1-88	42 43
Ready to generate steam not later than	1-1-86	1-1-87	1-1-88	1-1-89	45 46
Ready to generate steam at Maximum Capacity not later than	2-1-86	2-1-87	2-1-88	2-1-89	48 49 50
Erected complete in accor- dance with the contract and ready for operating tests not later than	3-1-86	3-1-87	3-1-88	3-1-89	52 53 54 55

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PART F - GENERAL SPECIFICATIONS 15

DIVISION F2 - SUPPLEMENTARY SPECIAL CONCITIONS 17
FOR OPTION TO ERECT BOILER UNITS 18

1. Modifications to the Special Conditions: If the 22
Option to Erect Boiler Units is exercised under Article 5 of the
Execution Document, the Special Conditions (Division F1) is 23
hereby modified as follows:

1.1 Page F1-1: Articles 1 and 2 are replaced with 26
the following:

"1. Scope of Work: Under the terms of the contract, 29
the Contractor shall furnish, deliver, and erect Boiler Units for 30
Intermountain Power Project, Units 1, 2, 3, and 4. 31

"2. Schedule: 34

"2.1 Erection of the Boiler Units: Materials and 37
equipment for each Boiler Unit shall be delivered to the plant
site not later than 30 calendar days nor sooner than 180 38
calendar days prior to the approved scheduled erection dates
stated in the Contractor's Boiler Erection Schedule. 39

"Erection of the Boiler Units shall be in 41
accordance with the following schedule:

	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	44 45
Begin lift of steam drum not sooner than	10-1-83	10-1-84	10-1-85	10-1-86	46 47
Ready for hydrostatic test not later than	9-1-85	9-1-86	9-1-87	9-1-88	49 50
Ready for boilout not later than	12-1-85	12-1-86	12-1-87	12-1-88	52 53
Ready to generate steam not later than	1-1-86	1-1-87	1-1-88	1-1-89	55 56
Ready to generate steam at Maximum Capacity not later than	2-1-86	2-1-87	2-1-88	2-1-89	58 59 60
Erected complete in accor- dance with the contract and ready for operating tests not later than	3-1-86	3-1-87	3-1-88	3-1-89	62 63 64 65

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"2.2 <u>Additional Construction Schedule Requirements:</u>	68
"2.2.1 <u>General:</u> This Subarticle covers the requirements for scheduling the erection portion of the work under this contract.	71
"The IPA will furnish a Critical Path Method (CPM) of planning and scheduling for use by the Contractor to produce Project Schedules in addition to manual scheduling methodology. The CPM will enable the work on the plant site to be planned and prosecuted in an orderly and expeditious manner, to assist the Contractor and other contractors in coordinating work, to determine completion status, evaluate progress, and to detect adverse trends for purposes of initiating and implementing timely recovery action.	74 75 76 77 78 79
"The Project Construction Logic Diagrams (PCLD) for the overall construction of the Intermountain Power Project will be made available to the Contractor after award of contract. As an aid to the Contractor, designated activities of the PCLD to be performed under this contract have been graphically highlighted. However, all activities affecting the Contractor's work may not have been so highlighted. PCLD are not intended to indicate the scope of the Contractor's work. They are intended as a reference tool for the Contractor in developing input for the schedule documents defined in Subarticle 2.2.	81 82 83 84 85 86 87 88
"The Contractor shall actively participate in a mutually agreed upon schedule development and implementation program and shall provide the information in a format similar to and at the frequencies specified herein.	90 91 92
"2.2.2 <u>Definitions:</u> Terms used in this Subarticle shall have meanings as defined herein. The term "construction" as applied to this contract shall mean the erection portion of the work under this contract.	95 96 97
"(a) Project Construction Logic Diagrams (PCLD) shall mean the activity sequence diagrams developed by the Engineer for the entire Intermountain Power Project to illustrate major construction activities and key interfaces between various on-site contractors.	99 100 101
"(b) Project Construction Control Schedule Diagrams (PCCSD) shall mean the time sequence diagrams developed by the Engineer from the PCLD, including appropriate approved input from the Contractor, other contractors, and other appropriate input as determined by the Engineer.	103 104 105 106

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"(c) Project Construction Control Schedule (PCCS) shall mean the overall construction schedule developed by the Engineer for the entire Intermountain Power Project, based on input by other contractors, input in the various forms specified herein, and other appropriate input as determined by the Engineer.	108 109 110 111
"(d) Contractor's Construction Schedule Diagrams (CCSD) shall mean the time sequence network diagrams developed by the Contractor.	113 114
"(e) Contractor's Construction Schedule (CCS) shall mean the construction schedule developed by the Contractor.	116 117
"(f) Approved Construction Control Schedule Diagrams (ACCS) shall mean the CCSD approved by the Engineer.	119 120
"(g) Approved Construction Control Schedule (ACCS) shall mean the CCS developed by the Engineer from Engineer-approved data submitted by the Contractor with the CCS.	122 123 124
"2.2.3 <u>Milestone Dates</u> : The milestone dates listed in Subarticle 2.1 of this Division are associated only with the major items of the erection portion of the work under this contract or they indicate key interface dates with the work of other contractors. The completion dates indicated are essential to the work under this contract and to the coordination and continuity of all work at the plant site.	127 128 129 130 131
"The listing of activities and dates is not intended to be a complete or detailed listing of all erection work under this contract or of all interfaces with the work of other contractors.	133 134
"It is understood and agreed that the completion dates listed are the latest feasible completion dates for the activity and that earlier dates may be achieved as agreed by the Contractor and Engineer.	136 137 138
"2.2.4 <u>Schedule Development and Implementation</u> :	140
"2.2.4.1 <u>General</u> : Construction schedules shall be prepared, submitted, and implemented as specified herein.	143
"The PCCSD and the PCCS will be used to monitor overall project status; the ACCSD and the ACCS will be used to monitor the Contractor's progress under this contract.	145 146

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"The Engineer will develop and maintain the PCLD, the PCCS, and the ACCS utilizing a computer. The Contractor shall develop the CCSD, the CCS, and the ACCSD. In addition, the Contractor shall provide the services of his personnel as required to assist the Engineer in the preparation and maintenance of the documents and the submittal of supplementary information as specified herein or as required by the Engineer.	148 149 150 151 152
"If requested by the Contractor, the Engineer will arrange meetings with the Contractor prior to schedule development to discuss the fundamentals of CPM scheduling and the role of the Contractor in the development of overall project scheduling documents.	154 155 156
"The Contractor shall develop and submit to the Engineer for review the CCSD and the CCS. Such documents shall include, as a minimum, the information specified herein. The time of submittal of the CCSD and CCS shall be within 30 calendar days after date of award of contract.	158 160 161 162
"The CCSD shall be in precedence network form and shall indicate, as a minimum, all Contractor activities highlighted in the PCLD. All activities shall be coded to the work item numbers indicated on the PCLD issued to the Contractor. Each activity shall include the proper interfaces including restraints from other contractors, a description of the activity, duration, and the manpower requirements by craft. Erection activities of more than 20 calendar days or less than 3 calendar days duration shall be minimized.	164 165 166 167 168 169 170
"The CCS shall be comprised of complete detailed information on all Contractor activities, including dates for "early start - early finish," "late start - late finish," and total float of each activity corresponding to the CCSD. The CCS shall be computer generated except as otherwise permitted by the Engineer.	172 173 174 175
"The Engineer will review the CCSD and CCS. Following review, the Engineer will return these documents within 14 calendar days after receipt with review comments to the Contractor or may arrange a meeting with the Contractor to discuss the effectiveness of the CCSD and CCS in meeting the schedule and interface requirements of the overall project.	178 179 180 181
"Following return of Engineer comments, or meetings with the Engineer, the Contractor shall incorporate the required revisions and resubmit the CCSD and CCS to the Engineer within 14 calendar days.	183 184 185

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"Upon Engineer approval of the CCSD, the CCSD shall be used by the Contractor to generate the ACCSD and the information thereon will be incorporated in the PCCSD by the Engineer.

"2.2.4.2 Reporting and Updating: Not less than 14 calendar days prior to each Schedule Objectives Meeting, as specified in Article 2.2.6 of this Division, the Contractor shall complete and submit to the Engineer a monthly action update report and any proposed revisions to the ACCSD. The report shall indicate the actual start and finish dates and remaining duration of all Contractor activities performed during the reporting period. The report shall also provide an analysis of progress and shall identify problem areas with corresponding proposed corrective action.

"The Contractor shall also notify the Engineer, in writing, of the effects of contract changes or conditions which may cause delays in the performance of the Contractor's erection work.

"The PCCSD, PCCS, and ACCS will all be updated by the Engineer based on data submitted as specified above and in accordance with decisions rendered at the Schedule Objectives Meeting. The ACCSD shall be revised by the Contractor based on Engineer approval of any proposed revisions.

"2.2.5 Supplemental Scheduling Information:

"2.2.5.1 General: In addition to the principal scheduling information specified hereinbefore to be prepared and submitted, the Contractor may be required to submit other supplemental scheduling information; to participate in the development of bar chart schedules to reflect the current status of his work on designated functional systems during the current reporting periods; and to reflect anticipated status for subsequent reporting periods.

"2.2.5.2 Commodity "S" Curves: Not later than 30 calendar days prior to commencing work at the plant site, the Contractor shall submit to the Engineer Commodity "S" Curves plotting anticipated units of production on a monthly basis during the life of the erection portion of the contract. Forms for this submittal will be provided by the Engineer. Thereafter, the Contractor shall submit monthly markups of the Commodity "S" Curves plotting actual production for the month.

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"The Contractor Commodity "S" Curves shall include, but not be limited to, the following items that are included in the contract:	223 224
(a) High-pressure pipe welding.	226
(b) Low-pressure pipe welding.	228
(c) Small bore pipe erection.	230
(d) High-pressure pipe erection.	232
(e) Low-pressure pipe erection.	234
(f) Structural steel erection - tons.	236
2.2.6 <u>Schedule Objectives Meetings</u> : On a monthly basis, the Engineer will conduct a Schedule Objectives Meeting for the purpose of reviewing overall project status.	239 240
When required by the Engineer, the Contractor shall be represented at such meetings by personnel who have decision making authority and who are intimately familiar with the project, project schedules, and current status of the Contractor's work.	242 243 244
When requested by the Engineer, the Contractor shall report on the status of his work as such work impacts the overall project and as otherwise required to evaluate actual project status.	246 247
2.2.7 <u>Coordination</u> : The Contractor shall coordinate his work with that of other contractors and shall cooperate fully with the Engineer in maintaining orderly progress towards completion of the work as scheduled. The Engineer's decision regarding priority between the Contractor's work and the work of other contractors at the site shall be final and shall not be cause for extra compensation or extension of time, except where extension of time is granted because of actual and unavoidable delay."	250 251 253 254 255 256
1.2 <u>Page F1-15</u> : Article 12 is replaced with the following:	259
12. <u>Balance</u> : All rotating parts, except pulverizers, shall be statically and dynamically balanced by the Contractor so that there will be no undue or harmful vibration during operation."	262 263

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The following Key Items shall be delivered not sooner than 45 calendar days prior to the following dates and not later than the following dates:

<u>Key Items</u>	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	
Steam Drum	9-16-83	9-16-84	9-16-85	9-16-86	63
Penthouse Headers	11-11-83	11-11-84	11-11-85	11-11-86	64
Upper Furnace Buckstays	11-11-83	11-11-84	11-11-85	11-11-86	66
Intermediate Furnace Buckstays	11-25-83	11-25-84	11-25-85	11-25-86	72
Upper Wall Panels	12-9-83	12-9-84	12-9-85	12-9-86	73
Lower Furnace Buckstays	12-9-83	12-9-84	12-9-85	12-9-86	75
Burners	12-9-83	12-9-84	12-9-85	12-9-86	77
Burner Piping	12-9-83	12-9-84	12-9-85	12-9-86	79
Horizontal Reheat Superheat and Economizer Sections	12-18-83	12-18-84	12-18-85	12-18-86	81
Remaining Loose Headers, Downcomers	1-6-84	1-6-85	1-6-86	1-6-87	83
Superheat and Reheat Pendant Sections and Roof Tubes	1-13-84	1-13-85	1-13-86	1-13-87	86
Pulverizers	2-6-84	2-6-85	2-6-86	2-6-87	89
Flues and Ducts	4-13-84	4-13-85	4-13-86	4-13-87	90

2.2 Spare Parts and Pulverizer Replacement Parts: 99
All spare parts and pulverizer replacement parts shall be delivered on a mutually agreed schedule. 100

3. Options: Any options will be exercised by the issuance and delivery to the Contractor of an order therefor by the Project Manager or his duly authorized representatives. If any option is exercised, the Contractor shall furnish a faithful performance bond and a labor and material payment bond, each 104
105
106
107

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such bond in an amount equal to 50 percent of the full amount of such option.

4. Contractor's Meeting: A meeting will be held at a location designated by the Project Director at which time the Contractor shall meet with the Project Director and management and design representatives of the IPA. The meeting will be held not sooner than 150 calendar days and not later than 210 calendar days after the effective date of contract. The meeting will consist of a discussion of job progress and boiler design.

The Project Director may also hold, at approximately 3-month intervals and at locations designated by the Project Director, additional job progress and boiler design meetings with the Contractor.

The Contractor's Chief Executive Officer in charge of the design and construction divisions for the Boiler Units shall attend the meetings.

5. Letters to the Project Manager: All letters pertaining to this contract, except those letters pertaining to invoices, packing lists, and bills of lading, written to the IPA after the effective date of contract shall show the contract number and title and shall be addressed as follows:

Mr. J. H. Anthony
Intermountain Power Project Director, Room 931
Los Angeles Department of Water and Power
P. O. Box 111
Los Angeles, California 90051

Re: Contract 2010N
Boiler Units for Intermountain
Power Project, Units 1, 2, 3, and 4

(a) All letters pertaining to invoices shall be addressed in accordance with Article 18 of Division F1.

(b) All letters pertaining to packing lists and bills of lading shall be addressed in accordance with Article 13 of Division F1.

6. Contractor's Drawings: Drawings shall be submitted in accordance with the following schedule:

6.1 List of Drawings: Within 75 calendar days after the effective date of contract, the Contractor shall submit to the Engineer for approval a list of the drawings which he

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proposes to submit for approval, setting forth descriptive titles, the expected date on which each drawing will be submitted, and, if possible, drawing numbers. The list shall be revised and extended as necessary during the progress of the work.

6.2 Drawings to be Furnished:

6.2.1 Drawings to be furnished within 60 calendar days after the effective date of contract shall show:

(a) General arrangement of plan, rear, side, and front elevations showing locations of all access openings and soot blowers, and key plan.

(b) Outside boiler dimensions, expansion requirements, clearance and preliminary access requirements, location of columns and configuration of boiler support grid, seismic tie attachment points, preliminary weights, forces, and moments to be transmitted to the structural framing, and all other pertinent information that will enable the IPA to proceed with the layout of the structural steel frame.

6.2.1.1 Drawings to be furnished within 90 calendar days after the effective date of contract shall show:

(a) Final access requirements, the magnitude, direction, and location of the forces at the points of attachment of hangers and seismic ties, reaction forces of safety valves, and all other pertinent information that will enable the IPA engineers to proceed with the design of the structural steel frame.

(b) The weights and locations of all major equipment furnished by the Contractor and information required for location of platforms.

(c) Structural steel final design drawings of all structural steel supports which are to be attached directly to the main structural frame or foundation to be furnished by IPA. These drawings shall be signed by a Civil or Structural Engineer registered in the State of Utah.

6.2.2 Drawings to be furnished within 150 calendar days after the effective date of contract shall show:

(a) Data for all motors as follows:

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(1) Motor information including the name of manufacturer, catalog designation, intended use, and the nameplate markings, in accordance with NEMA MG1, Part 10, as last revised.	187 188
(2) Number and rating of heaters in each motor.	190
(3) Additional data to be furnished for vertical motors:	192
[a] Manufacturer and catalog number of thrust bearing.	194
[b] Manufacturer and catalog number of guide bearing.	196
[c] Load on thrust bearing at design point.	198
[d] Actual maximum downthrust load on thrust bearing during operation of pumps.	200
[e] Manufacturer's downthrust rating of thrust bearing.	202
[f] Maximum momentary upthrust on thrust bearing.	204
[a] Manufacturer's momentary upthrust rating of thrust bearing.	206
[b] Superheater, reheater, and economizer header connections and tube material and thickness for each section.	208 209
[c] Air and flue gas ducts.	211
[d] Air heaters.	213
[e] Coal feeders and pulverizers.	215
6.2.3 Drawings to be furnished within 180 calendar days after the effective date of contract shall show:	217
(a) Deleted.	219
(b) Deleted.	221
(c) Pressure and temperature of the fluid in all drums and headers for the Boiler Unit at Maximum Capacity.	223 224

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(d) Temperature of flue gas entering and leaving each superheater, reheater, and economizer section, temperature of flue gas entering the air heater, and the corrected and uncorrected temperature of the flue gas leaving the air heater.	226 227 228
(e) Reference list of valves and accessories showing quantities, location, description, drawing numbers, service conditions, and function.	230 231
(f) Detailed arrangement of the burner front including arrangement of coal piping and recommended arrangement of ignitor and warm-up burner oil piping.	233 234
(g) The following information for the primary air fans shall be furnished:	236
(1) Location of the center of gravity of the stationary part of the fan with respect to the centerline of the shaft.	238 239
(2) Weight and weight moment of inertia of the stationary part of the fan with respect to the centerline of the shaft.	241 242
(3) Weight and weight moment of inertia of the rotating part of the fan including coupling with respect to the centerline of the shaft.	244 245
6.2.4 Drawing to be furnished within 240 calendar days after the effective date of contract shall show:	247
(a) Deleted.	249
(b) Details of all instruments and controls furnished including schematic and logic diagrams, drawings of outline dimensions and mounting requirements, and functional cutaways.	251 252
(c) Expansion movements at all boiler and equipment interface connections.	254
(d) Thermocouple arrangement and installation standards.	256
(e) Sootblower system including supports, recommended wiring, piping, and controls.	258
(f) Coal and ignitor oil systems including assembly and details, controls, and complete wiring diagrams.	260 261

1.2 Page F1-15: Article 12 is replaced with the 259
following:
"12. Balance: All rotating parts, except 262
pulverizers, shall be statically and dynamically balanced by the
Contractor so that there will be no undue or harmful vibration 263
during operation."

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(q) Wiring diagrams of valve motor operators, showing details of terminals and auxiliary switches and including connections to remote equipment.	263 264
6.2.5 Drawings to be furnished within 300 calendar days after the effective date of contract shall show the outline dimensional drawings of all electrical equipment including all electric motors. Drawings shall also show the weight of the equipment.	266 267 268
6.2.6 All other drawings shall be furnished within 420 calendar days after the effective date of contract and shall include the following:	270 271
internals. (a) Drum detail drawings and details of all drum	273
(b) Sealing devices.	275
joints. (c) All <u>welding procedures</u> and details of welded	277
(d) Details of headers.	279
(e) Damper details and torque requirements.	281
(f) Access doors.	283
(g) Piping and insulation.	285
(h) Setting.	287
(i) Boiler tube arrangement drawings which shall provide, but not be limited to, the information shown on Contractor's Drawings 258954E and 231747E attached as Exhibits B and C, respectively.	289 290
6.3 <u>General</u> : Any combination of items listed above may be shown on a single drawing if the clarity is not thereby impaired.	293 294
Additional drawings, instructions, or information which may be requested by the Engineer for erection, operation, and maintenance of the equipment or to determine compliance with the contract shall likewise be submitted for approval.	296 297 298
It is imperative that the drawings be furnished within the time required herein, in order that the design of related facilities may be progressed on schedule.	300 301

Transparencies shall be positive and right reading.	303
They shall not be folded and shall be sufficiently legible to	304
make 35 mm microfilm negatives which can be read clearly when	305
enlarged 14 times.	
All drawings shall be accompanied by a letter of	307
transmittal and shall be submitted in such sequence that the	308
Engineer will have all of the information necessary for checking	
and approving each drawing at the time it is submitted. Each	310
drawing shall be identified by a number and a descriptive title.	
The drawings shall fully demonstrate that the	312
equipment to be furnished will comply with the provisions of	313
these specifications and shall furnish a true and complete	314
record of the equipment as manufactured and delivered. Approval	315
of such drawings by the Engineer will be based on compliance	
with these conditions.	
Within 45 calendar days after receipt of the drawings	317
for approval, one print of each will be returned to the	
Contractor by letter stamped "approved", "approved with changes	318
noted", or "not approved".	
If a drawing is "approved", the Contractor may proceed	320
with the work covered by the drawing.	321
If a drawing is "approved with changes noted", the	323
Contractor may proceed with the work covered by the drawing and	324
the changes noted. However, the Contractor shall promptly	325
revise the drawing in accordance with the changes noted and	326
submit a transparent copy.	
If a drawing is "not approved", the Contractor shall	328
correct the drawing and resubmit a transparent copy for	329
approval. Progress of work covered by drawings marked "not	330
approved" is not authorized by the IPA.	
Revised drawings shall be submitted in the same size	332
as the original submitted except when completely redrawn.	333
Approval by the Engineer of the Contractor's drawings	335
shall not relieve the Contractor of the responsibility to meet	336
all of the requirements of these specifications or of the	337
responsibility for the correctness of the drawings furnished by	
the Contractor. The Contractor shall have no claim for	338
additional costs or extension of time on account of delays due	339
to revisions of the drawings which may be found necessary to	
comply with the contract. In case of later discovery of error,	340
omission, or inconsistencies in the Contractor's drawings, the	341

Contractor shall promptly submit revised transparencies to the Engineer for approval.

If the drawings contain information which does not 343
pertain to the equipment being furnished, the Contractor shall 344
either delete the information which is not applicable or plainly 345
identify the pertinent information.

6.4 Availability of Shop Drawings: All applicable 348
contract shop drawings shall be available to the Engineer at the
Contractor's and subcontractor's fabrication facilities. 349

The Contractor shall provide the Project Manager 351
detail drawings, as selected by the Project Manager for his 352
review and comment. The Project Manager will not have the right 353
of approval, but any valid questions or comments will be
addressed.

7. Contractor's Information: Information shall be 356
submitted in accordance with the following schedule:

7.1 Except for general arrangement drawings for major 358
subcontracted equipment, which shall be submitted within 150 359
calendar days after the effective date of contract, information 360
to be furnished within 180 calendar days after the effective
date of contract shall include the following:

(a) Final design information regarding the 362
magnitude, direction, and location of the forces at the points
of attachment of hangers and seismic ties, reaction of safety 363
valves, and all other pertinent information that will enable the 364
IPA engineers to proceed with the design of the structural steel 365
frame.

(b) The maximum dynamic loads resulting from the 367
imbalance of rotating equipment. The following information 368
shall be furnished for all fan units:

(1) The first critical speed of the assembled 370
unit. The critical speed is defined as that speed equal to the 371
natural frequency of the combined spring-mass system of rotor, 372
bearing housing, oil film, and bearing pedestal, but excluding
the reinforced concrete foundation.

(2) The weight and weight moment of inertia of 374
the rotor.

(3) The weight and location of the center of 376
gravity of the fan housing and of the motor.

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(4) The diameters and the bearing-to-bearing length of the shaft.	378
(5) Fan drawings indicating dimensions and total weight.	360
(6) The amplitude (Fo) and frequency (w) of the dynamic force resulting from rotor imbalance in the form $F(t) = F_o \sin wt$ such that the Engineer can predict the motion of the foundation.	382 383
(c) Complete performance data, including the following, for the Boiler Units at steam output of 100, 75, 50, and 25 percent of the steam flow at Maximum Capacity and at maximum continuous rating:	385 386
(1) Pressure and temperature of the fluid in all drums and headers.	388
(2) Pressure drop and capacity of spray desuperheaters.	390
(3) Flue gas pressure in inches of water entering and leaving:	392
[a] Furnace.	394
[b] Each superheater, reheater, and economizer section.	396
[c] Air heater.	396
(4) Temperature of flue gas entering and leaving each superheater, reheater, and economizer section.	400 401
(5) Corrected and uncorrected flue gas temperature leaving air heater.	403
(6) Flue gas rate of flow leaving air heater at corrected temperature stated above - cfm.	405
(7) Flue gas rate of flow - 10 ³ lb/hr, as follows:	403
[a] Entering air heater.	411
[b] Leaving air heater.	413

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(8) Distribution percentages of total gas flow through each superheater and reheater section if dampers are provided to control steam temperature.	415 416
(9) Excess air - percent, as follows:	418
[a] Leaving furnace.	420
[b] Leaving economizer.	422
[c] Leaving air heater.	424
(10) Air - 10 ³ lb/hr, as follows:	426
[a] Entering air heater.	428
[b] Leaving air heater.	430
(11) Air entering air heater at 80F - cfm.	432
(12) Air temperature - F, as follows:	434
[a] Entering air heater.	436
[b] Leaving air heater.	438
(13) Air pressure - inches of water, as follows:	440
[a] Loss through air heater.	442
[b] Permanent loss through air flow measuring device, dampers, and ducts.	444
[c] Required at burner windbox.	446
[d] Total required at air heater inlet.	448
(14) Heat absorbed by Boiler Unit percent.	450
(15) Heat loss, percent, due to:	452
[a] Water from combustion of hydrogen.	454
[b] Theoretical dry gas.	456
[c] Excess air and moisture contained therein, measured at the gas outlet of the air heater.	458

[d] Moisture in theoretical air.	460
[e] Moisture in fuel.	462
[f] Radiation.	464
[g] Carbon in ash.	466
[16] Combustion gas velocity per square foot of free area - fps, as follows:	468
[a] Leaving the furnace.	470
[b] Entering the superheater.	472
[c] Entering the reheater.	474
[17] Coal consumption - pounds per hour.	476
[d] Recommended chemical treatment of boiler feedwater.	478
[e] Curves showing temperature gradient through the water and steam circuits of the boiler.	480
[f] Curves of average steam temperature, design steam temperature, average and maximum heat absorption rates, and design metal temperatures plotted against the length of superheater and reheater tubing.	482 483
[g] Sootblower system including supports, recommended wiring, piping, and controls.	485
[h] Coal and ignitor oil systems including assembly details and controls.	487
[i] Superheat and reheat temperature, combustion, and feedwater systems.	489
7.2 Information to be furnished within 240 calendar days after the effective date of contract shall include the following:	491 492
(a) Functional details of all instruments and controls furnished including all interface requirements.	494
(b) Sufficient computations to justify the design of the boiler suspension steel and those portions of the seismic supports that are attached to the IPA's frame. These	496 497 498

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computations shall be signed by the person responsible therefor, who shall be a Civil or Structural Engineer registered in the State of Utah. 499

7.3 All other information shall be furnished within 420 calendar days after the effective date of contract and shall include the following: 501 502

- (a) Drum and drum internals. 504
- (b) Sealing devices. 506
- (c) Damper details and torque requirements. 508
- (d) Piping and insulation. 510
- (e) Setting. 512

7.4 It is imperative that all information be furnished within the agreed times in order that the design of related equipment may proceed on schedule. 514 515

8. Production Location: The boiler components shall not be produced at locations or facilities different from those listed below unless written approval of the Engineer has been obtained. 518 519

Barberton Works	Canton Works	522
P.O. Box 351	1501 Raif Road S.W.	523
Barberton, Ohio 44203	P.O. Box 3020	524
(216) 753-4511	Canton, Ohio 44710	525
	(216) 478-1441	526
West Point Works	Brunswick Works	528
Old Aberdeen Road	South Albany Street	529
P.O. Box 677 & 1297	P.O. Box 1478	530
West Point, Miss. 39773	Brunswick, Ga. 31520	531
(601) 494-1323	(912) 265-0510	532
Paris Works	Wilmington Works	534
1200 - 19th Street, S.W.	P.O. Box 1730	535
Route 5	Vance Street	536
Paris, Texas 75460	Wilmington, N.C. 28402	537
(214) 784-2571	(919) 791-9010	538

9. Contractor's Purchase Orders: The Contractor shall promptly provide to the Engineer a copy of those purchase orders requested by the Engineer. These copies of purchase orders shall be complete, showing material properties, 542 543

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quantities, items, conditions of delivery, and manufacturer's name. They will be used for assisting the Engineer, and prices need not be shown. 544 545

The Contractor shall notify the Engineer of any changes to purchased equipment and shall promptly provide to the Engineer a copy of the corrected purchase order showing the changes. 547 548

10. Seismic Design Requirements: The following seismic design criteria shall be used in the design of all equipment, equipment components, and supports furnished by the Contractor under these specifications: 551 552

10.1 Boiler: The main boiler structure and the boiler internals shall be designed to resist the stresses resulting from operating loads plus equivalent uniform static seismic forces applied at the center of gravity of the contributory elements equal to $0.2q$ in any horizontal direction and $0.13q$ in either vertical direction times the operating weight of the contributory elements. These forces shall be combined simultaneously or used separately to produce the most severe internal stresses. The resulting stresses shall not exceed the allowable stress requirements of applicable codes and standards. No increase in allowable stress for seismic load shall be used for the design of connections and anchorage assemblies. There shall be no permanent distortion of the boiler walls or internals as a result of the application of the specified design loads, and all systems shall be functional and operable subsequent to the application of these loads. 555 556 557 558 559 560 561 562 563 564 565

10.2 Other Equipment: All other equipment and equipment cabinets furnished by the Contractor shall be designed to resist operating loads and seismic equivalent static forces applied at the center of gravity of the contributory elements equal to $0.30q$, in any horizontal direction and $0.20q$ in either vertical direction times the operating weights of the contributory elements. The above loads shall be applied simultaneously or separately and in the directions which will produce the most severe internal stresses. These stresses shall not exceed the allowable stress requirements of applicable codes and standards. All systems, equipment, and components shall be functional and operable subsequent to the application of these loadings, except that all systems, equipment, and components necessary for the safe shutdown of a Boiler Unit shall remain functional and operable during and subsequent to the application of seismic forces up to the maximum loadings specified. 568 569 570 571 572 574 575 576 577 578

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<u>10.3 Seismic Anchorage of Other Equipment:</u>	581
anchorage of auxiliary boiler equipment (other equipment)	
supported independently of the main Boiler Unit shall be	582
designed for the loadings described herein and the following:	
(a) Steel support frames shall be designed and	584
fabricated in accordance with the AISC Specification for the	585
Design, Fabrication, and Erection of Structural Steel for	
Building, with no increase allowed for seismic.	586
(b) Support frames and anchorage assemblies	588
including anchor bolts shall be designed for operating loads	589
plus an equivalent static seismic force applied at the center of	590
gravity of the equipment equal to 0.5 times the weight of the	
equipment in any direction using AISC allowable stresses with no	591
increase allowed for seismic.	
(c) Anchor bolts shall be not less than 9/16-inch	593
diameter and made of ductile material. Unless otherwise	595
specified in the bidder's proposal, all anchor bolts 4 inches or	
smaller in diameter shall comply with the requirements of ASTM A	596
307, Grade A.	
<u>11. Identification of Contractor's Employees:</u>	599
IPA will provide the Contractor with sufficient identification	
badges for himself and for his subcontractors, employees, and	600
representatives who will be required to enter upon the IPA's	601
construction site.	
These badges shall be worn at all times while on the	603
site and shall be displayed whenever required.	
The Contractor shall be responsible for the issuance	605
of such badges and the return of same to the IPA when any of the	606
following events transpire:	
(a) Discharge, layoff, or resignation of the	608
person to whom the badge was issued.	
(b) Completion of the contract or subcontract.	610
(c) Expiration of the time limit if badges are	612
issued for a stated period.	
<u>12. Balance:</u>	615
All rotating parts, except pulverizers,	
shall be statically and dynamically balanced by the Contractor	
at the factory so that there will be no undue or harmful	616
vibration during operation.	

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13. Shipment: All shipments shall be properly boxed, 610
crated, packed, or otherwise protected to prevent damage in 620
transit and storage. All parts shall be prepared for shipment 621
so that slings for handling can be readily attached while the 622
parts are on the car or truck. Where it is unsafe to attach 623
slings to the box, boxed parts shall be packaged with slings 624
attached to the parts so that attachments can readily be made.
Before shipment, all finished iron and steel external parts 625
shall be covered with a readily removable rust-preventing 626
compound, and all finished bright work shall be suitably wrapped 627
or otherwise protected from damage. All pipe flanges shall be 628
protected by flange protectors bolted on, plugs shall be 629
inserted into all tapped holes, and all other openings shall be
adequately protected to prevent entrance of dirt and moisture 630
during shipment.

Each package shall be plainly marked with the 632
following:

(a) An identifying number, which also shall appear 634
on the bill of lading and other documents relating to shipment. 635

(b) Name and address of consignor and Contractor. 637

(c) IPA's contract number and Item number. 639

(d) Sufficient information to identify the 641
contents, and when possible, the name of the machine or 642
equipment of which the contents form a part.

(e) Consignee's name and address as shown in the 644
Proposal Schedule.

(f) Shipping weight. 646

Each package shall contain a detailed packing list 648
containing package and contract numbers and a description of the 649
contents, including quantities, part or unit identifications,
and part numbers, if applicable.

Spare parts shall not be packaged with other material. 651

All equipment delivered by truck shall be capable of 653
being unloaded from 3 sides of the truck bed with a forklift 654
loader or from above with an overhead crane. All equipment 655
~~delivered by rail shall be on flat cars.~~

*BITB 4/11/83
per B&W letter 8/11/82*

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<u>1.3 Pages F1-17 and F1-18: Article 16 is replaced with the following:</u>	266
<u>"16. Engineering Services Furnished by Contractor:</u>	268
The Contractor shall furnish an adequate number of competent service engineers during the preliminary operation period of each Boiler Unit, with such period beginning with preparation for boilout and ending when a unit is complete and ready for Operating Tests.	269 270 271
<u>"The IPA will furnish suitable office space at the site for the service engineers.</u>	273
<u>"In addition to the service engineers from the Contractor's company, the Contractor shall furnish service engineers from the companies furnishing the following equipment:</u>	275 276
<u>"(a) Air heaters.</u>	278
<u>"(b) Soot blowers.</u>	280
<u>"(c) Safety valves.</u>	282
<u>"(d) Burners.</u>	284
<u>"(e) Boiler circulation pumps, if furnished.</u>	286
<u>"(f) Coal feeders.</u>	288
<u>"(g) Coal pulverizers.</u>	290
<u>"(h) Primary air fans.</u>	292
<u>"(i) Burner management logic control system, if furnished.</u>	294
<u>"(j) Mechanical continuous ash removal system, if furnished.</u>	296
<u>"The service engineer shall determine that each Boiler Unit and appurtenances were properly installed and made ready to operate. The service engineer shall furnish instructions to IPA personnel as to proper procedure for installation, starting up, and initial operation of the equipment; however, the service engineer shall not assume executive charge of such work but shall provide technical direction and instructions so that the IPA, to the extent that it follows the recommendations of the Contractor, shall be</u>	298 299 300 301 302 303

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relieved of claims by the Contractor that failure is due to 304
improper work of installation. The service engineer shall also 305
determine and report to the IPA and limits of proper operating
conditions, particularly for excess air, pulverizer and burner 306
ranges, steam temperature control ranges, maximum steam
generation capability, maximum load pickup rates, and boiler 307
water purity.

"The Contractor shall instruct plant supervisory 309
operating personnel on all special requirements for operating 310
and maintaining the equipment furnished."

1.4 Page 19: The following paragraph is added to 313
Article 19:

"The Contractor shall cooperate with the IPA and 315
other contractors by avoiding interference with the work and 316
storage of materials of others engaged upon the work and by
performing his work in the proper sequence in relation to that 317
of other contractors and as directed by the Engineer."

2. List of Subcontractors: Should the Contractor 320
contemplate subcontracting any part of the work covered by these
specifications, he shall submit prior to the start of the work 321
by any subcontractor a description of the work to be done under 322
such subcontract, together with the name and address of the 323
proposed subcontractor who shall perform each part of the work.
No other subcontract shall be made by the Contractor without 324
first receiving the written approval of the Engineer thereto. 325

3. Lines, Grades, and Measurements: The IPA will 328
establish a survey for the control of all lines and levels for 329
the use of the Contractor. The Contractor shall preserve all 330
bench marks, monuments, survey marks, and stakes and in case of 331
their removal or destruction by him or his employees, he shall 332
be liable for the cost of their replacement.

The Contractor shall set all lines and levels, as 334
indicated on the drawings, all targets and batter boards 335
required for the work, and shall be responsible for their 336
accuracy. The Engineer will check all lines and levels set by 337
the Contractor from time-to-time but the responsibility for the 338
accuracy of all such dimensions shall rest entirely with the 339
Contractor.

4. No Payment for Temporary Works: No direct payment 342
will be made to the Contractor for providing transportation, 343
light, power, tools, and equipment, or for furnishing, building,

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Copies of the packing lists and bills of lading shall 657
be sent to the IPA, in accordance with Article 13 of Division 658
E1, on or before the date the packages are shipped.

14. Additional Information Required by Contractor: 660
The Contractor shall make timely application for any additional 661
information which he requires and shall not proceed without 662
clear knowledge of the specifications.

15. Contractor's Project Manager: The Contractor's 665
Project Manager shall not be assigned any responsibilities other 666
than the administration of this contract. The Contractor's
Project Manager shall not be reassigned before all Boiler Units 667
have been accepted without the written approval of the Engineer.
Replacement personnel for the Contractor's Project Manager and 668
other key project and plant site personnel shall be selected 669
only after mutual agreement between the Engineer and the
Contractor and written confirmation by the Engineer. 670

16. Engineering Services Furnished by Contractor: 672
The Contractor shall furnish an adequate number of competent 673
erection and service engineers for 30 months during the erection 674
and preliminary operation period of each Boiler Unit, with such
period beginning with preparation for erection and ending when a 675
unit is complete and ready for Operating Tests.

The erection and service engineers shall report for 677
duty on the day requested provided the Engineer gives notice in 678
writing not less than 30 calendar days prior to the date such
erection and service engineers will be required. 679

The IPA will furnish suitable office space at the site 681
for the erection and service engineers.

The normal workday (or shift) of erection engineers 683
shall be 8 hours per day, Monday through Friday, exclusive of 684
holidays. Any hours expended in excess of the normal workday or 685
any work on Saturdays, Sundays, or holidays will be considered 686
overtime. All overtime authorized by the Project Manager will 687
be paid for by the IPA as an addition to the contract price.
This will be 1-1/2 times the base rate in effect at the time the 688
work is performed.

The erection engineer shall furnish instructions to 690
IPA personnel as to proper procedure for storage and handling of 691
equipment and erection of the Boiler Units; however, the
erection engineer shall not assume executive charge of such work 692
but shall provide technical direction and instructions so that 693
the IPA, to the extent that it follows the recommendations of

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the Contractor, shall be relieved of claims by the Contractor that failure is due to improper work of erection. 694

In addition to the service engineers from the Contractor's company, the Contractor shall furnish service engineers from the companies furnishing the following equipment: 696
697

- (a) Air heaters. 699
- (b) Soot blowers. 701
- (c) Safety valves. 703
- (d) Burners. 705
- (e) Boiler circulation pumps, if furnished. 707
- (f) Coal feeders. 709
- (g) Coal pulverizers. 711
- (h) Primary air fans. 713
- (i) Burner management logic control system, if furnished. 715
- (j) Mechanical continuous ash removal system, if furnished. 717

The service engineer shall determine that each Boiler Unit and appurtenances were properly installed and made ready to operate. The service engineer shall furnish instructions to IPA personnel as to proper procedure for installation, starting up, and initial operation of the equipment; however, the service engineer shall not assume executive charge of such work but shall provide technical direction and instructions so that the IPA, to the extent that it follows the recommendations of the Contractor, shall be relieved of claims by the Contractor that failure is due to improper work of installation. The service engineer shall also determine and report to the IPA the limits of proper operating conditions, particularly for excess air, pulverizer and burner ranges, steam temperature control ranges, maximum steam generation capability, maximum load pickup rates, and boiler water purity. 719
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The Contractor shall instruct plant supervisory operating personnel on all special requirements for operating and maintaining the equipment furnished. 730
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17. Future Engineering Services: When requested by the IPA, the Contractor shall furnish engineering services from time to time for the life of the Boiler Units for services related to design, repair, modification, and operation of the Boiler Units. Such services shall be provided at the Contractor's standard fee for engineering services or in the event that the Contractor does not normally provide such engineering services for others at a fee of cost plus 15 percent. 734 735 736 737 738 739
- The services of key service engineers identified in accordance with Article 15 of this Division shall be available, as required, during the guarantee period of each Boiler Unit. 741 742
18. Right to Operate Unsatisfactory Equipment: If the operation of the equipment after installation proves to be unsatisfactory to the Engineer, the IPA shall have the right to operate such equipment until it can be taken out of service without injury to the IPA for the correction of defects, errors, or omissions, provided the period of such operation pending the correction of defects, errors, or omissions shall not exceed one year without written consent of the IPA and the Contractor. 745 746 747 748 749
19. Cooperation of Contractor: The Contractor shall cooperate with the Engineer in the design of adjacent or connecting equipment and steel work furnished by the IPA and shall provide information for this purpose as required by the Engineer's time schedule. 752 753 754
- Extra expense by the IPA caused by access requirements not identified by the Contractor in accordance with Articles 6 and 7 of this Division shall be the sole responsibility of the Contractor and such extra expense will be charged against the Contractor. 756 757 758
- See Pg. F1-19a*
20. Instruction Books: The Contractor shall furnish 3 complete identical sets of detailed instruction books for all equipment furnished under these specifications. These books shall be accompanied by a letter of transmittal and shall contain all illustrations, detailed drawings, wiring diagrams, and instructions necessary for installing, operating, and maintaining the equipment. The instruction books shall also contain 11-inch by 17-inch copies of all approved drawings. The illustrated parts shall be numbered for identification. All information contained therein shall apply specifically to the equipment furnished and shall not include instructions not applicable. Photographs, ozalids, Xerox, and similar types of reproductions shall not be attached to pages. All such 761 763 764 766 767 768 769 770 771

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other contractors by avoiding interference with the work and 316
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of other contractors and as directed by the Engineer."

2. List of Subcontractors: Should the Contractor 320
contemplate subcontracting any part of the work covered by these
specifications, he shall submit prior to the start of the work 321
by any subcontractor a description of the work to be done under 322
such subcontract, together with the name and address of the 323
proposed subcontractor who shall perform each part of the work.
No other subcontract shall be made by the Contractor without 324
first receiving the written approval of the Engineer thereto. 325

3. Lines, Grades, and Measurements: The IPA will 328
establish a survey for the control of all lines and levels for 329
the use of the Contractor. The Contractor shall preserve all 330
bench marks, monuments, survey marks, and stakes and in case of 331
their removal or destruction by him or his employees, he shall 332
be liable for the cost of their replacement.

The Contractor shall set all lines and levels, as 334
indicated on the drawings, all targets and batter boards 335
required for the work, and shall be responsible for their 336
accuracy. The Engineer will check all lines and levels set by 337
the Contractor from time-to-time but the responsibility for the 338
accuracy of all such dimensions shall rest entirely with the 339
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light, power, tools, and equipment, or for furnishing, building,

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and maintaining sanitary conveniences, disposal works, water supply, guards, trestles, and other temporary works, or for the removal of all temporary structures and materials, or for watchmen, or guards or for any other service, thing, or material, unless payment therefor has been definitely provided. Compensation for all such services, facilities, things or materials necessary or required to execute the work in accordance with the provisions of the contract shall be considered as having been included in the contract price.	344 345 346 347 348 349 350
5. <u>Construction Plant and Temporary Facilities:</u> The Contractor shall furnish all construction plant, utilities, temporary facilities, equipment, materials, and supplies required for prosecution of the erection work but which will not be incorporated in the completed work, unless otherwise specified herein.	353 354 355
All temporary structures and facilities furnished by the Contractor shall remain the property of the Contractor and shall be maintained throughout the erection work. When the erection work is completed, all such temporary structures and facilities shall be removed from the site and the area shall be restored to its original condition.	357 358 359 360
The IPA will provide heated office space in the construction office building for the Contractor's supervisors and office personnel. A separate heated and lighted building for lunch and changing purposes with toilet facilities will be furnished by IPA for the use of all construction personnel at the site. The Engineer will establish regulations on the use of these facilities as necessary to maintain the proper standards of sanitation and fire prevention.	362 363 364 365 366 367
The IPA will provide a structure at the construction area access gate for time checking personnel.	369
Temporary structures for warehousing of materials requiring indoor storage will be provided by IPA. The Engineer will regulate the usage of these structures.	371 373
Temporary structures for offices, change houses, and other uses for the Contractor or his subcontractors shall be provided by the Contractor using materials, design, and construction approved by the Engineer as to compliance with these specifications. Suitable construction trailers may be used in lieu of temporary structures. Such structures or trailers shall be placed only in locations assigned by the Engineer.	375 376 377 378 379

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<u>6. Construction Utilities:</u> Construction utilities required for the prosecution of work shall be provided by the Contractor or IPA as specified herein.	382 383
<u>6.1 Telephone:</u> The Contractor shall provide his own telephone service and other site communication facilities required to meet his needs.	386 387
<u>6.2 Compressed Air:</u> The Contractor shall provide all air compressors, fuels, lubricants, hoses, piping, and other apparatus required for supplying compressed air required for prosecution of his work.	390 391
<u>6.3 Construction Power:</u> The IPA will furnish all energy for construction power and temporary lighting at no charge.	394
The construction power supply system will be provided by the IPA and will consist of several power supply centers located throughout the plant site and lay-down areas. Power will be available for the Contractor's use at 480Y/277 volts, 3-phase. This system shall be for the use of all contractors performing work on the site and its use will be coordinated by the Engineer.	396 397 398 399 400
A limited amount of power will be available at 208Y/120 volts, 3-phase. Use of this power will also be coordinated by the Engineer. If the Contractor requires more power at this voltage than he is designated to receive, he shall provide his own 480-volt to 208Y/120-volt transformation equipment.	402 403 404 405
The Contractor shall connect his power supply circuits to fused disconnect switches at the power supply centers. These circuits shall be direct buried, with a minimum of 2 feet of earth cover from the power supply centers to the Contractor's distribution facilities. Direct-buried cable shall be installed in galvanized steel conduit from the equipment in which it is terminated to 2 feet below grade.	407 409 410 411 412
Cable marking tape shall be located 12 inches above all direct-buried cable. Cable marking tape shall be yellow plastic strip 6 inches wide with the words "Caution Buried Electric" printed in black and shall be Allen Systems, Inc. tape.	414 415 416
The Contractor shall furnish and install transformers, distribution panels, disconnect switches, breakers, wiring, and	418 419

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other devices required to distribute power for the prosecution of his work. The Contractor's distribution facilities shall conform with applicable safety and code requirements, shall be constructed to provide proper clearances and minimum interference with construction, and shall be subject to the approval of the Engineer as to compliance with these specifications. All temporary wiring shall be in conformance with Article 305, Temporary Wiring, of the National Electric Code. All temporary wiring in the yard shall be direct-buried.

The Contractor-furnished conductor shall be stranded or solid copper for 12 AWG and 10 AWG and stranded aluminum or copper for 8 AWG and larger. All above ground 480-volt circuits shall be multi-conductor with neoprene or metal sheaths or shall be installed in conduit. The single-conductor cable shall have Type THW insulation. All direct-buried cable shall be NEC Type USE.

6.4 Temporary Lighting: The Contractor shall furnish and install all temporary lighting required for the safe efficient execution of his work and for the security of his work and property. Conductors shall be not less than 12 AWG copper and insulated for 600 volts. A fuse shall be provided for the protection of each circuit.

6.5 Water: Water for construction use will be furnished by the IPA at no charge at a hydrant or hydrants designated by the Engineer.

The Contractor shall provide piping, valves, and hoses as required to distribute the water for his use.

The IPA will provide a source of supply for sanitary drinking water. The Contractor shall provide sanitary drinking water facilities for his employees including coolers, ice, disposable cups, and a trash barrel for each water container or cooler. Each disposer shall be emptied, cleaned, and refilled at the start of each day. Personnel shall be assigned to assure maintenance of the water supply.

6.6 Sanitary Facilities: The IPA will furnish and maintain a system of toilets for the use of all construction employees. The toilets will be furnished in numbers and locations as required to adequately and conveniently serve the needs of all construction employees and as required by state and local regulations.

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Construction personnel shall not use the permanent plant toilet and washroom facilities.	457
6.7 <u>Heat</u> : The Contractor shall provide all heating facilities required for the efficient prosecution of his work and as required to prevent freeze damage to equipment under his custody. The method of heating shall be subject to the approval of the Engineer as to compliance with these specifications.	460 461 462 463
Salamander stoves, open fires, or other methods which constitute a hazard to personnel or property shall not be used. All heating equipment shall be provided with adequate safeguards.	465 466 467
6.8 <u>Cleanup and Fire Protection</u> : The Contractor shall be responsible for cleanup and fire protection of his work except as noted herein.	470
6.8.1 <u>Cleanup</u> : The Contractor shall provide cleanup as specified in Article 13 of Division E2.	473
The IPA will furnish trash collection and disposal services for all construction work on the plant site as follows:	475 476
(a) The IPA will furnish, under separate contract, trash containers at collection points designated by the Engineer. These trash collection containers will be clearly marked and separate containers will be provided for combustible, noncombustible, and rubble (broken masonry and concrete) materials. The Contractor shall provide the specified cleanup of his construction area and deposit all trash materials in the designated containers.	478 479 480 481 482 483
(b) The IPA, under separate contract, will empty all trash collection containers and haul to the on-site landfill area for disposal.	485 486
(c) The IPA, under separate contract, will operate the on-site landfill.	488
(d) The IPA, under separate contract, will periodically pick up all scrap, trash, waste, and other construction debris in the general plant site as determined by the Engineer. However, the Contractor shall be responsible for the cleanliness of his work area as specified.	490 491 492
6.8.2 <u>Fire Protection</u> : Only work procedures which minimize fire hazards to the extent practicable shall be used.	495

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Combustible debris and waste materials will be collected and removed to the on-site landfill each day by others under separate contract. Fuels, solvents, and other volatile or flammable materials shall be stored away from the construction and storage areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Contractor throughout the construction period. The Contractor shall follow the recommendations of the AGC Manual of Accident Prevention in Construction regarding fire hazards and fire prevention.	496 497 498 500 501 502 503
Untreated canvas, paper, plastic, and other flammable flexible materials shall not be used on the site for any purpose. If such materials are on equipment or materials which arrive at the site, they shall be removed and replaced with an acceptable covering before storing or moving into the construction area.	505 506 507 508
Corrugated paper and fiberboard cartons shall not be used in the construction area for the storage or handling of materials. If such cartons do arrive in the construction area, they shall be immediately unpacked and removed from the plant site. Flexible materials for covering shall be waterproof and flame resistant.	510 511 512 513 514
Formwork, scaffolding, planking, and similar materials which are combustible but which are essential to execution of the work shall be treated for fire resistance or otherwise protected against combustion resulting from welding sparks, cutting flames, and similar fire sources.	516 517 518
Temporary heating facilities shall not be left unattended.	520
The Contractor's supervisory personnel and a sufficient number of workmen shall be instructed in proper methods for extinguishing fires and shall be assigned specific fire protection duties. When trained personnel leave the job, new personnel shall be trained in their duties. All workmen shall be instructed in the selection and the operation of each type of fire extinguisher for each type of fire which might be encountered.	522 523 524 525 526
The Contractor shall provide adequate fire protection equipment in each warehouse, office, and other temporary structures, and in each work area he is occupying as specified herein. Access to sources of fire water shall be identified and kept open at all times. Suitable fire extinguishers shall be	528 529 530 531

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provided in enclosed areas, in areas which are not accessible to fire water, or in areas which may be exposed to fire that cannot be safely extinguished with water. Each fire extinguisher shall be of a type suitable for extinguishing fires which might occur in the area in which it is located. In areas where more than one type of fire might occur, the type of fire extinguisher required in each case shall be provided. Each extinguisher shall be placed in a convenient, clearly identified location which will most likely be accessible in the event of fire.

The fact that the Engineer has inspected the fire protection shall not relieve the Contractor from responsibility for the above fire protection requirements.

The IPA will furnish a construction fire protection system consisting of fire water storage, fire pumps, piping, hydrants, accessories, fire station, and a fire pumper truck. personnel to operate the fire pumper truck will be furnished by the IPA under separate contract. The Contractor shall furnish all other personnel and equipment including fire extinguishers, and the Contractor shall be responsible for providing adequate fire protection.

6.9 Welding Facilities: The IPA will furnish and install a centralized welding power system consisting of constant potential d-c buses of both straight and reverse polarity and outlets. The Contractor shall furnish individual welding control units with input leads and equipment required for his use. Individual welding machines shall be provided by the Contractor for welding operations conducted remote from the generation building area.

Specialized welding which cannot be performed using the IPA's central welding facilities shall be performed by the Contractor using his own equipment.

7. Other Services Furnished by the IPA: The IPA will furnish services without charge to the Contractor at the plant site as follows:

(a) Water for hydro tests and distilled water and feedwater chemicals for hydro tests and preliminary operations.

(b) Acid cleaning of the boiler during preliminary operations.

(c) Personnel to operate the boiler.

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(d) Steam, fuel, and lubricants required for preliminary operation.	569
(e) Use of yard for storage of miscellaneous parts, yard trackage, and yard engine for spotting cars. All car spotting not performed by the railroad will be provided by the IPA.	571 573
(f) Parking for construction personnel.	575
(g) Provide and maintain site perimeter fencing and install and relocate temporary fencing and barriers as required.	577 578
(h) Periodic snow removal services as required.	580
(i) Operate and maintain a first aid station and ambulance services.	582
(j) Provide railroad sidings in the general vicinity of the plant site and into the boiler cavity. The railroad sidings will be used by other contractors at the plant site. The Contractor shall not interfere with the operations of these contractors using these railroad sidings.	584 585 586
The above services will be available at points designated by the Engineer. Before making shipment, the Contractor shall inform himself of the status of the above services with particular regard as to availability, voltages, pressure, and quantities. All matters pertaining to the above services shall be subject to the approval of the Engineer whose decision shall be final.	588 589 590 591 592
8. <u>Receiving, Handling, and Storage:</u> The Contractor shall promptly receive, unload, and place into storage or construction all equipment, materials, and supplies furnished under these specifications as they arrive at the plant site.	595 596
8.1 <u>Receiving:</u> Upon arrival at the plant site, the Contractor shall examine all shipments for shortages, discrepancies, or damage. He shall prepare a receiving report itemizing the material received and submit it to the Engineer. The receiving report shall be on a form supplied by, and in the number of copies required by, the Engineer.	599 601 602
8.2 <u>Handling:</u> The Contractor shall be responsible for any damage to equipment and materials while in his custody.	605

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The Contactor shall unload all carriers promptly and shall pay any demurrage incurred.	607
Materials shall be handled with due care to prevent damage or loss.	609
8.3 <u>Storage</u> : All equipment, materials, and supplies not immediately incorporated in the work shall be placed in storage. Storage areas will be allocated and assigned by the Engineer. The storage areas shall be kept neat and orderly at all times.	612 613 614
All electric motors shall be continuously heated during the time they are in storage and until they are placed in initial operation. The heat shall be applied by energizing the built-in space heaters where supplied. Motors not equipped with space heaters shall have heat applied in a manner acceptable to the Engineer.	616 617 618 619
9. <u>Scaffolding</u> : The Contractor shall furnish all scaffolding, staging, ladders, flooring, runways, and any other temporary construction required for the execution of his work.	622 623
All scaffolding, runways, and other temporary construction shall be self-supporting throughout and shall be rigidly built so as to support safely the weight of all materials, apparatus, equipment, and construction personnel to be placed thereon and as required by federal, state, and local laws.	625 626 627
10. <u>Progress Reports</u> : Once a month beginning with the start of erection, the Contractor shall furnish 8 copies of a progress report transmitted by letter to the Project Manager.	630 631
The report shall show the actual or estimated date of the start and completion of each principal phase of the Boiler Unit erection the Contractor is to perform. The percentage of the above operations completed shall also be shown.	633 634 635
The information given on a current report for all operations relating to each major phase of erection shall be completed and updated to reflect previously completed work so that it will not be necessary to refer to prior reports.	637 638 639
In the event that progress reports are not submitted or do not present the actual status of the work as required by the Project Manager, the Project Manager will take any necessary action to secure the information.	641 642 643

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<u>11. Permanent Elevators Used for Construction:</u>	645
permanent elevators will be erected early by the IPA for use	646
during construction. The Engineer will coordinate and control	647
the use of the permanent elevators used during construction.	
Construction use of permanent elevators for each Boiler Unit	648
will terminate upon boil out of the respective Boiler Unit,	649
except for elevators located in the control area. All other	650
elevators and equipment including temporary construction	
elevators, if required, shall be furnished by the Contractor.	651
<u>12. Facilities Furnished by IPA:</u> The IPA will	654
provide in due time adequate foundations, foundation bolts, and	
structural steel or other equipment not supplied by the	655
Contractor hereunder but required for a continuous and orderly	
erection program. This will include, where applicable,	656
permanent walkways, flooring, and stairways. On larger boiler	657
installation, the site shall be considered ready for the start	
of erection when walkways and stairways are in place from ground	658
level to the upper level and the Contractor has set rigging in	
place ready to raise materials. The steel and platforms as	660
provided by the IPA will be in compliance with OSHA Standards.	
The Contractor shall, upon final design of the	662
equipment to be installed hereunder, indicate to the Engineer	663
all "leave out" steel required so that an orderly erection	
sequence can proceed. The Contractor shall not include the	664
installation of this steel in the quoted prices. The IPA will	665
install the "leave out" steel at no expense to the Contractor or	
an extra work order, in accordance with Subarticle 1.3 of	666
Division E2, will be issued to cover this added scope.	

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illustrations shall be incorporated within the printing of the page to form a durable and permanent reference book. 772

The instruction books shall be delivered not later than 12 months prior to the scheduled date for boilout of Boiler Unit 1. 774
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The IPA will inform the Contractor by letter within 45 calendar days after receipt of the instruction books either that the instruction books are approved as submitted or that revisions are required. If approved, the Contractor shall promptly furnish 13 additional sets identical to the approved copy. If revisions are required, one set will be returned to the Contractor with the required revisions indicated. The required revisions shall be promptly incorporated in the instruction books, and a total of 16 complete, identical sets of such revised instruction books shall be furnished to the Engineer. Delay in delivery of the instruction books or revisions thereto will be cause for delay in acceptance of the equipment. 777
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"20.1 Customer Training Program: In addition to the instruction books, the Contractor shall provide a training program which includes the following services.

(a) Videotape training

- (1) A total of 23 standard videotapes shall be provided as follows.

<u>Topic</u>	<u>No. of Tapes</u>
RB Boiler Series	7
Unit Description	
Unit Design	
Fuel, Coal	
Air System	
Gas System	
Water System	
Steam System	
Dual Register Burners	1
CFA Lighters	1
Diamond Sootblowers	1
Feedwater Treatment (RB Boilers)	1
Optimizing Combustion	1
Controlling Slag	1
Protecting Pressure Parts	1
Steam Temperature Control	1
MPS Pulverizer Operation Series	3
Pulverizer Description	
Pulverizer Operating Theory	
Pulverizer Operating Checks	
MPS Pulverizer Maintenance Series	5
Introduction to Pulv. Maint.	
Periodic Maintenance	
Renewal of Grinding Elements I	
Renewal of Grinding Elements II	
Renewal of Other MPS Hardware	

A total of six custom videotapes shall be provided as follows.

<u>Topic</u>	<u>No. of Tapes</u>
Custom Features I and II	2

This two tape series shall address the specific design and operational characteristics not covered in the standard training material. A sampling of some of the topics to be covered are:

- specific unit design features
- unit air flow paths
- unit gas flow paths
- principles of air heater operation
- fuel system features
- furnace design
- oil conservation
- auxiliary system features

Burner Controls	1
Bypass System - Description & Operation	1
Unit Startup and Shutdown	1
FD Fan Description and Operation	1
	<u>6</u>

(b) Training Manuals

Four volumes of 100 each of training manuals shall be provided. They shall supplement the training videotapes - except in greater detail

- Volume 1 RB Boiler Series
- Volume 2 Standard Products and Operational Programs
- Volume 3 MPS Pulverizer Maintenance
- Volume 4 Custom Products Manual

(c) Specialty Graphics

<u>Description</u>	<u>Quantity</u>
A large 40" x 60" sectional side illustration of the boiler shall be provided. It shall include all major components, be color coded, and identify most technical features and equipment.	1
A large 40" x 60" maintenance drawing of the furnace and convection pass shall also be provided. Tube metals and their actual locations shall be color coded on the illustration.	1
A 30" x 40" specialty drawing of the RB bypass system is an additional graphic which shall be prepared for training use or substituted with an equivalent illustration if requested by the IPA.	5

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(d) On-Site Training

An instructor shall present all the above mentioned training topics during a seminar to be held at the job site. The length of the seminar shall be between one to two weeks, and can be more accurately determined after the custom training material is developed. An agenda shall be provided well in advance of the scheduled seminar and coordi-

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<u>Product or Service</u>	<u>Delivery Date</u>
Standard Video tapes	June 1, 1983
Custom Video tapes	December 1, 1983
Training Manuals:	
Volume 1	July 15, 1983
Volume 2	July 30, 1983
Volume 3	July 15, 1983
Volume 4	Six months after receipt of required information regard- ing plant startup procedures

<u>Product or Service</u>	<u>Delivery Date</u>
Sectional Side Illustration	July, 1983
Maintenance Illustration	August, 1983
Bypass Graphic	September, 1983
On-Site Seminar	Per IPA requirements"

Pricing addition for the customer training program is as follows.

	<u>Unit 1</u>
	\$
Base training program	166,000.00
75 additional training manuals	<u>1,875.00</u>
Total	167,875.00

21. Contractor's Erection Information Packages: The 787
 Contractor ~~shall furnish 2 complete identical sets of detailed~~
erection information packages for the Boiler Units. These 788
~~erection information packages shall be accompanied by a letter~~
~~of transmittal~~ and shall contain all illustrations and 789
 instructions necessary for the scheduling, unloading, storage, 790
 uncrating, preparing equipment for installation, cleaning, 791
 erection and assembly, welding, alignment, and checking work 792
 performed. The illustrated parts shall be numbered and indexed 793
 for identification. All information contained therein shall 794
 apply specifically to the Boiler Units furnished and shall not 795
 include instructions not applicable. Contractor's drawings 796
 submitted under Article 6 of this Division may be referred to in 797
 these erection information packages as necessary. A list of 798
 such Contractor's drawings shall be included giving the title 799
 and drawing number; copies of such drawings need not be included 800
 in these erection information packages.

Information contained in the erection information 799
 packages shall include the following:

- (a) Scope of work identifying termination points. 801
- (b) Breakdown of boiler parts and associated 802
 equipment with weights, specifications, and drawing references. 804
- (c) Bills of material for piping, instruments, 806
 hangers, clips, spacers, and anchors.

(d) Welding data sheets showing size, material, 808
quantity of field welds, and recommended welding procedures. 809

(e) Data on quantity, type, and application of 811
brick, refractory, insulation, and lagging.

The Contractor's erection information packages shall 813
be submitted not later than 18 months prior to the date of the 814
first delivery of the equipment.

The Contractor's erection information packages shall 816
be subject to the approval of the Engineer as to compliance with 817
the foregoing requirements. Later revisions needed to make the 818
erection information packages comply with the equipment as
finally manufactured shall be supplied promptly by the 819
Contractor. If, after award of a contract for the erection of 820
the Boiler Units, the Contractor's erection information packages
are found to be incomplete or incorrect, the Contractor shall 821
reimburse the IPA for all additional work required as a result 822
of such incomplete or incorrect information.

22. Progress Reports: Once a month beginning with 825
the start of engineering or manufacturing whichever occurs
first, the Contractor shall furnish 8 copies of a progress 826
report transmitted by letter to the Project Manager.

The report shall show the actual or estimated date of 828
the start and completion of manufacturing, testing, and shipment 829
of each of the principal parts of the equipment and material 830
which the Contractor is to furnish. The percentage of the above 831
operations completed shall also be shown. The information given 832
on a current report for all operations relating to each major
part shall be completed as of the date of the report so that it 833
will not be necessary to refer to prior reports.

In the event that progress reports are not submitted 835
or do not present the actual status of the work as required by 836
the Project Manager, the Project Manager will take any necessary
action to secure the information. 837

23. Foundations: The Contractor shall provide the 840
Engineer with general arrangement drawings, in accordance with
Subarticle 6.2 of this Division, showing the equipment with 841
reference to foundations, including loading diagrams and
location of anchor bolts in the foundations. Adequate 843
foundations, having plan measurements in accordance with such
drawings, including foundation bolts and plates, concrete work, 844
all excavation, will be furnished in place in due time by IPA.
The Contractor shall not be responsible for the depth of the 845

DIVISION F1

footings, size or accuracy of the foundations, or the character 846
of the materials selected for their construction or for any
damages or repairs necessary to the equipment furnished by it, 847
caused by or resulting from defects in or settlement of the
foundations.

PART F - GENERAL SPECIFICATIONS 15

DIVISION F2 - SUPPLEMENTARY SPECIAL CONDITIONS 17
FOR OPTION TO ERECT BOILER UNITS 18

1. Modifications to the Special Conditions: If the 22
Option to Erect Boiler Units is exercised under Article 5 of the
Execution Document, the Special Conditions (Division F1) is 23
hereby modified as follows:

1.1 Page F1-1: Articles 1 and 2 are replaced with 26
the following:

"1. Scope of Work: Under the terms of the contract, 29
the Contractor shall furnish, deliver, and erect Boiler Units for 30
Intermountain Power Project, Units 1, 2, 3, and 4. 31

"2. Schedule: 34

"2.1 Erection of the Boiler Units: Materials and 37
equipment for each Boiler Unit shall be delivered to the plant
site not later than 30 calendar days nor sooner than 180 38
calendar days prior to the approved scheduled erection dates
stated in the Contractor's Boiler Erection Schedule. 39

"Erection of the Boiler Units shall be in 41
accordance with the following schedule:

	<u>Boiler Unit 1</u>	<u>Boiler Unit 2</u>	<u>Boiler Unit 3</u>	<u>Boiler Unit 4</u>	
Begin lift of steam drum not sooner than	10-1-83	10-1-84	10-1-85	10-1-86	44 45 46 47
Ready for hydrostatic test not later than	9-1-85	9-1-86	9-1-87	9-1-88	49 50
Ready for boilout not later than	12-1-85	12-1-86	12-1-87	12-1-88	52 53
Ready to generate steam not later than	1-1-86	1-1-87	1-1-88	1-1-89	55 56
Ready to generate steam at Maximum Capacity not later than	2-1-86	2-1-87	2-1-88	2-1-89	58 59 60
Erected complete in accor- dance with the contract and ready for operating tests not later than	3-1-86	3-1-87	3-1-88	3-1-89	62 63 64 65

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"2.2 <u>Additional Construction Schedule Requirements:</u>	68
"2.2.1 <u>General:</u> This Subarticle covers the requirements for scheduling the erection portion of the work under this contract.	71
"The IPA will furnish a Critical Path Method (CPM) of planning and scheduling for use by the Contractor to produce Project Schedules in addition to manual scheduling methodology. The CPM will enable the work on the plant site to be planned and prosecuted in an orderly and expeditious manner, to assist the Contractor and other contractors in coordinating work, to determine completion status, evaluate progress, and to detect adverse trends for purposes of initiating and implementing timely recovery action.	74 75 76 77 78 79
"The Project Construction Logic Diagrams (PCLD) for the overall construction of the Intermountain Power Project will be made available to the Contractor after award of contract. As an aid to the Contractor, designated activities of the PCLD to be performed under this contract have been graphically highlighted. However, all activities affecting the Contractor's work may not have been so highlighted. PCLD are not intended to indicate the scope of the Contractor's work. They are intended as a reference tool for the Contractor in developing input for the schedule documents defined in Subarticle 2.2.	81 82 83 84 85 86 87 88
"The Contractor shall actively participate in a mutually agreed upon schedule development and implementation program and shall provide the information in a format similar to and at the frequencies specified herein.	90 91 92
"2.2.2 <u>Definitions:</u> Terms used in this Subarticle shall have meanings as defined herein. The term "construction" as applied to this contract shall mean the erection portion of the work under this contract.	95 96 97
"(a) Project Construction Logic Diagrams (PCLD) shall mean the activity sequence diagrams developed by the Engineer for the entire Intermountain Power Project to illustrate major construction activities and key interfaces between various on-site contractors.	99 100 101
"(b) Project Construction Control Schedule Diagrams (PCCSD) shall mean the time sequence diagrams developed by the Engineer from the PCLD, including appropriate approved input from the Contractor, other contractors, and other appropriate input as determined by the Engineer.	103 104 105 106

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"(c) Project Construction Control Schedule (PCCS) shall mean the overall construction schedule developed by the Engineer for the entire Intermountain Power Project, based on input by other contractors, input in the various forms specified herein, and other appropriate input as determined by the Engineer.	108 109 110 111
"(d) Contractor's Construction Schedule Diagrams (CCSD) shall mean the time sequence network diagrams developed by the Contractor.	113 114
"(e) Contractor's Construction Schedule (CCS) shall mean the construction schedule developed by the Contractor.	116 117
"(f) Approved Construction Control Schedule Diagrams (ACCS) shall mean the CCSD approved by the Engineer.	119 120
"(g) Approved Construction Control Schedule (ACCS) shall mean the CCS developed by the Engineer from Engineer-approved data submitted by the Contractor with the CCS.	122 123 124
"2.2.3 <u>Milestone Dates</u> : The milestone dates listed in Subarticle 2.1 of this Division are associated only with the major items of the erection portion of the work under this contract or they indicate key interface dates with the work of other contractors. The completion dates indicated are essential to the work under this contract and to the coordination and continuity of all work at the plant site.	127 128 129 130 131
"The listing of activities and dates is not intended to be a complete or detailed listing of all erection work under this contract or of all interfaces with the work of other contractors.	133 134
"It is understood and agreed that the completion dates listed are the latest feasible completion dates for the activity and that earlier dates may be achieved as agreed by the Contractor and Engineer.	136 137 138
"2.2.4 <u>Schedule Development and Implementation</u> :	140
"2.2.4.1 <u>General</u> : Construction schedules shall be prepared, submitted, and implemented as specified herein.	143
"The PCCSD and the PCCS will be used to monitor overall project status; the ACCSD and the ACCS will be used to monitor the Contractor's progress under this contract.	145 146

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"The Engineer will develop and maintain the PCLD, the PCCS, and the ACCS utilizing a computer. The Contractor shall develop the CCSD, the CCS, and the ACCSD. [REDACTED]	148
[REDACTED]	149
[REDACTED]	150
[REDACTED]	151
[REDACTED]	152
"If requested by the Contractor, the Engineer will arrange meetings with the Contractor prior to schedule development to discuss the fundamentals of CPM scheduling and the role of the Contractor in the development of overall project scheduling documents.	154
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"The Contractor shall develop and submit to the Engineer for review the CCSD and the CCS. Such documents shall include, as a minimum, the information specified herein. The time of submittal of the CCSD and CCS shall be within 30 calendar days after date of award of contract.	158
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"The CCSD shall be in precedence network form and shall indicate, as a minimum, all Contractor activities highlighted in the PCLD. All activities shall be coded to the work item numbers indicated on the PCLD issued to the Contractor. Each activity shall include the proper interfaces including restraints from other contractors, a description of the activity, duration, and the manpower requirements by craft. Erection activities of more than 20 calendar days or less than 3 calendar days duration shall be minimized.	164
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"The CCS shall be comprised of complete detailed information on all Contractor activities, including dates for "early start - early finish," "late start - late finish," and total float of each activity corresponding to the CCSD. The CCS shall be computer generated except as otherwise permitted by the Engineer.	172
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"The Engineer will review the CCSD and CCS. Following review, the Engineer will return these documents within 14 calendar days after receipt with review comments to the Contractor or may arrange a meeting with the Contractor to discuss the effectiveness of the CCSD and CCS in meeting the schedule and interface requirements of the overall project.	178
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"Following return of Engineer comments, or meetings with the Engineer, the Contractor shall incorporate the required revisions and resubmit the CCSD and CCS to the Engineer within 14 calendar days.	183
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"Upon Engineer approval of the CCSD, the CCSD shall be used by the Contractor to generate the ACCSD and the information thereon will be incorporated in the PCCSD by the Engineer.

"2.2.4.2 Reporting and Updating: Not less than 14 calendar days prior to each Schedule Objectives Meeting, as specified in Article 2.2.6 of this Division, the Contractor shall complete and submit to the Engineer a monthly action update report and any proposed revisions to the ACCSD. The report shall indicate the actual start and finish dates and remaining duration of all Contractor activities performed during the reporting period. The report shall also provide an analysis of progress and shall identify problem areas with corresponding proposed corrective action.

"The Contractor shall also notify the Engineer, in writing, of the effects of contract changes or conditions which may cause delays in the performance of the Contractor's erection work.

"The PCCSD, PCCS, and ACCS will all be updated by the Engineer based on data submitted as specified above and in accordance with decisions rendered at the Schedule Objectives Meeting. The ACCSD shall be revised by the Contractor based on Engineer approval of any proposed revisions.

"2.2.5 Supplemental Scheduling Information:

"2.2.5.1 General: In addition to the principal scheduling information specified hereinbefore to be prepared and submitted, the Contractor may be required to submit other supplemental scheduling information; to participate in the development of bar chart schedules to reflect the current status of his work on designated functional systems during the current reporting periods; and to reflect anticipated status for subsequent reporting periods.

"2.2.5.2 Commodity "S" Curves: Not later than 30 calendar days prior to commencing work at the plant site, the Contractor shall submit to the Engineer Commodity "S" Curves plotting anticipated units of production on a monthly basis during the life of the erection portion of the contract. Forms for this submittal will be provided by the Engineer. Thereafter, the Contractor shall submit monthly markups of the Commodity "S" Curves plotting actual production for the month.

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"The Contractor Commodity "S" Curves shall include,	223
but not be limited to, the following items that are included in	224
the contract:	
"(a) High-pressure pipe welding.	226
"(b) Low-pressure pipe welding.	228
"(c) Small bore pipe erection.	230
"(d) High-pressure pipe erection.	232
"(e) Low-pressure pipe erection.	234
"(f) Structural steel erection - tons.	236
<u>"2.2.6 Schedule Objectives Meetings: On a monthly</u>	239
<u>basis, the Engineer will conduct a Schedule Objectives Meeting</u>	
<u>for the purpose of reviewing overall project status.</u>	240
<u>"When required by the Engineer, the Contractor shall</u>	242
<u>be represented at such meetings by personnel who have decision</u>	243
<u>making authority and who are intimately familiar with the</u>	
<u>project, project schedules, and current status of the</u>	244
<u>Contractor's work.</u>	
<u>"When requested by the Engineer, the Contractor shall</u>	246
<u>report on the status of his work as such work impacts the</u>	247
<u>overall project and as otherwise required to evaluate actual</u>	
<u>project status.</u>	
<u>"2.2.7 Coordination: The Contractor shall coordinate</u>	250
<u>his work with that of other contractors and shall cooperate</u>	
<u>fully with the Engineer in maintaining orderly progress towards</u>	251
<u>completion of the work as scheduled. The Engineer's decision</u>	253
<u>regarding priority between the Contractor's work and the work of</u>	
<u>other contractors at the site shall be final and shall not be</u>	254
<u>cause for extra compensation or extension of time, except where</u>	255
<u>extension of time is granted because of actual and unavoidable</u>	256
<u>delay."</u>	
<u>1.2 Page F1-15: Article 12 is replaced with the</u>	259
<u>following:</u>	
<u>"12. Balance: All rotating parts, except</u>	262
<u>pulverizers, shall be statically and dynamically balanced by the</u>	
<u>Contractor so that there will be no undue or harmful vibration</u>	263
<u>during operation."</u>	

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1.3 Pages F1-17 and F1-18: Article 16 is replaced with the following: 266

"16. Engineering Services Furnished by Contractor: 268
The Contractor shall furnish an adequate number of competent 269
service engineers during the preliminary operation period of 270
each Boiler Unit, with such period beginning with preparation 271
for boilout and ending when a unit is complete and ready for
Operating Tests.

"The IPA will furnish suitable office space at the 273
site for the service engineers.

"In addition to the service engineers from the 275
Contractor's company, the Contractor shall furnish service 276
engineers from the companies furnishing the following equipment:

- "(a) Air heaters. 278
- "(b) Soot blowers. 280
- "(c) Safety valves. 282
- "(d) Burners. 284
- "(e) Boiler circulation pumps, if furnished. 286
- "(f) Coal feeders. 288
- "(g) Coal pulverizers. 290
- "(h) Primary air fans. 292
- "(i) Burner management logic control system, if 294
furnished.
- "(j) Mechanical continuous ash removal system, 296
if furnished.

"The service engineer shall determine that each 298
Boiler Unit and appurtenances were properly installed and made 299
ready to operate. The service engineer shall furnish 300
instructions to IPA personnel as to proper procedure for 301
installation, starting up, and initial operation of the 302
equipment; however, the service engineer shall not assume 302
executive charge of such work but shall provide technical 303
direction and instructions so that the IPA, to the extent that
it follows the recommendations of the Contractor, shall be

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relieved of claims by the Contractor that failure is due to improper work of installation. The service engineer shall also determine and report to the IPA and limits of proper operating conditions, particularly for excess air, pulverizer and burner ranges, steam temperature control ranges, maximum steam generation capability, maximum load pickup rates, and boiler water purity.	304 305 306 307
"The Contractor shall instruct plant supervisory operating personnel on all special requirements for operating and maintaining the equipment furnished."	309 310
1.4 Page ^{F1-19} 19 : The following paragraph is added to Article 19:	313
"The Contractor shall cooperate with the IPA and other contractors by avoiding interference with the work and storage of materials of others engaged upon the work and by performing his work in the proper sequence in relation to that of other contractors and as directed by the Engineer."	315 316 317
2. <u>List of Subcontractors</u> : Should the Contractor contemplate subcontracting any part of the work covered by these specifications, he shall submit prior to the start of the work by any subcontractor a description of the work to be done under such subcontract, together with the name and address of the proposed subcontractor who shall perform each part of the work. No other subcontract shall be made by the Contractor without first receiving the written approval of the Engineer thereto.	320 321 322 323 324 325
3. <u>Lines, Grades, and Measurements</u> : The IPA will establish a survey for the control of all lines and levels for the use of the Contractor. The Contractor shall preserve all bench marks, monuments, survey marks, and stakes and in case of their removal or destruction by him or his employees, he shall be liable for the cost of their replacement.	328 329 330 331 332
The Contractor shall set all lines and levels, as indicated on the drawings, all targets and batter boards required for the work, and shall be responsible for their accuracy. The Engineer will check all lines and levels set by the Contractor from time-to-time but the responsibility for the accuracy of all such dimensions shall rest entirely with the Contractor.	334 335 336 337 338 339
4. <u>No Payment for Temporary Works</u> : No direct payment will be made to the Contractor for providing transportation, light, power, tools, and equipment, or for furnishing, building,	342 343

DIVISION F2

and maintaining sanitary conveniences, disposal works, water 344
supply, guards, trestles, and other temporary works, or for the 345
removal of all temporary structures and materials, or for
watchmen, or guards or for any other service, thing, or 346
material, unless payment therefor has been definitely provided. 347
Compensation for all such services, facilities, things or 348
materials necessary or required to execute the work in 349
accordance with the provisions of the contract shall be
considered as having been included in the contract price. 350

5. Construction Plant and Temporary Facilities: The 353
Contractor shall furnish all construction plant, utilities,
temporary facilities, equipment, materials, and supplies 354
required for prosecution of the erection work but which will not
be incorporated in the completed work, unless otherwise 355
specified herein.

All temporary structures and facilities furnished by 357
the Contractor shall remain the property of the Contractor and 358
shall be maintained throughout the erection work. When the 359
erection work is completed, all such temporary structures and
facilities shall be removed from the site and the area shall be 360
restored to its original condition.

DELETED BY C.O.9
The IPA will provide heated office space in the 362
construction office building for the Contractor's supervisors 363
and office personnel. ~~A separate heated and lighted building~~ 364
~~for lunch and changing purposes with toilet facilities will be~~ 365
~~furnished by IPA for the use of all construction personnel at~~
~~the site. The Engineer will establish regulations on the use of~~ 366
~~these facilities as necessary to maintain the proper standards~~ 367
~~of sanitation and fire prevention.~~

ADDED BY C.O.#9
The requirement for the Owner to furnish one change/lunch facil-
ity. The Owner shall have no further responsibility for this
work. In lieu of this the Contractor shall furnish one 50' X
140' (12' ceiling) Butler Building. The Contractor shall
furnish, erect and perform all necessary cleaning and mainten-
ance of this facility as required for the first two units,
included will be interior walls and furnishing as required.
The Contractor shall retain title and all responsibility
for this building. Upon completion of this work the Contractor
of this building shall be responsible for total removal of
this building from the site including the foundations and
for returning the site to its original condition. The Con-
tractor may use up to 1000 square feet of this building for
other purposes.

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This amount to be billable with the next monthly pay request
after completion of this facility.

Should this facility be required for additional Generation
Units a price for the additional cleaning and maintenance
shall be negotiated.

Total price for Contract Section C-13 \$162,270.00

All other terms and conditions of this contract remain the same.

ADDED BY
C.O.X9

The IPA will provide a structure at the construction 369
area access gate for time checking personnel.

Temporary structures for warehousing of materials 371
requiring indoor storage will be provided by IPA. The Engineer 373
will regulate the usage of these structures.

Temporary structures for offices, change houses, and 375
other uses for the Contractor or his subcontractors shall be 376
provided by the Contractor using materials, design, and
construction approved by the Engineer as to compliance with 377
these specifications. Suitable construction trailers may be 378
used in lieu of temporary structures. Such structures or 379
trailers shall be placed only in locations assigned by the
Engineer.

F2-9 (4)

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<u>6. Construction Utilities:</u> Construction utilities required for the prosecution of work shall be provided by the Contractor or IPA as specified herein.	382 383
<u>6.1 Telephone:</u> The Contractor shall provide his own telephone service and other site communication facilities required to meet his needs.	386 387
<u>6.2 Compressed Air:</u> The Contractor shall provide all air compressors, fuels, lubricants, hoses, piping, and other apparatus required for supplying compressed air required for prosecution of his work.	390 391
<u>6.3 Construction Power:</u> The IPA will furnish all energy for construction power and temporary lighting at no charge.	394
The construction power supply system will be provided by the IPA and will consist of several power supply centers located throughout the plant site and lay-down areas. Power will be available for the Contractor's use at 480Y/277 volts, 3-phase. This system shall be for the use of all contractors performing work on the site and its use will be coordinated by the Engineer.	396 397 398 399 400
A limited amount of power will be available at 208Y/120 volts, 3-phase. Use of this power will also be coordinated by the Engineer. If the Contractor requires more power at this voltage than he is designated to receive, he shall provide his own 480-volt to 208Y/120-volt transformation equipment.	402 403 404 405
The Contractor shall connect his power supply circuits to fused disconnect switches at the power supply centers. These circuits shall be direct buried, with a minimum of 2 feet of earth cover from the power supply centers to the Contractor's distribution facilities. Direct-buried cable shall be installed in galvanized steel conduit from the equipment in which it is terminated to 2 feet below grade.	407 409 410 411 412
Cable marking tape shall be located 12 inches above all direct-buried cable. Cable marking tape shall be yellow plastic strip 6 inches wide with the words "Caution Buried Electric" printed in black and shall be Allen Systems, Inc. tape.	414 415 416
The Contractor shall furnish and install transformers, distribution panels, disconnect switches, breakers, wiring, and	418 419

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other devices required to distribute power for the prosecution of his work. The Contractor's distribution facilities shall conform with applicable safety and code requirements, shall be constructed to provide proper clearances and minimum interference with construction, and shall be subject to the approval of the Engineer as to compliance with these specifications. All temporary wiring shall be in conformance with Article 305, Temporary Wiring, of the National Electric Code. All temporary wiring in the yard shall be direct-buried.

The Contractor-furnished conductor shall be stranded or solid copper for 12 AWG and 10 AWG and stranded aluminum or copper for 8 AWG and larger. All above ground 480-volt circuits shall be multi-conductor with neoprene or metal sheaths or shall be installed in conduit. The single-conductor cable shall have Type THW insulation. All direct-buried cable shall be NEC Type USE.

6.4 Temporary Lighting: The Contractor shall furnish and install all temporary lighting required for the safe efficient execution of his work and for the security of his work and property. Conductors shall be not less than 12 AWG copper and insulated for 600 volts. A fuse shall be provided for the protection of each circuit.

6.5 Water: Water for construction use will be furnished by the IPA at no charge at a hydrant or hydrants designated by the Engineer.

The Contractor shall provide piping, valves, and hoses as required to distribute the water for his use.

The IPA will provide a source of supply for sanitary drinking water. The Contractor shall provide sanitary drinking water facilities for his employees including coolers, ice, disposable cups, and a trash barrel for each water container or cooler. Each disposer shall be emptied, cleaned, and refilled at the start of each day. Personnel shall be assigned to assure maintenance of the water supply.

6.6 Sanitary Facilities: The IPA will furnish and maintain a system of toilets for the use of all construction employees. The toilets will be furnished in numbers and locations as required to adequately and conveniently serve the needs of all construction employees and as required by state and local regulations.

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Construction personnel shall not use the permanent plant toilet and washroom facilities. 457

6.7 Heat: The Contractor shall provide all heating facilities required for the efficient prosecution of his work and as required to prevent freeze damage to equipment under his custody. The method of heating shall be subject to the approval of the Engineer as to compliance with these specifications. 460
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Salamander stoves, open fires, or other methods which constitute a hazard to personnel or property shall not be used. All heating equipment shall be provided with adequate safeguards. 465
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6.8 Cleanup and Fire Protection: The Contractor shall be responsible for cleanup and fire protection of his work except as noted herein. 470

6.8.1 Cleanup: The Contractor shall provide cleanup as specified in Article 13 of Division E2. 473

The IPA will furnish trash collection and disposal services for all construction work on the plant site as follows: 475
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(a) The IPA will furnish, under separate contract, trash containers at collection points designated by the Engineer. These trash collection containers will be clearly marked and separate containers will be provided for combustible, noncombustible, and rubble (broken masonry and concrete) materials. The Contractor shall provide the specified cleanup of his construction area and deposit all trash materials in the designated containers. 478
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(b) The IPA, under separate contract, will empty all trash collection containers and haul to the on-site landfill area for disposal. 485
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(c) The IPA, under separate contract, will operate the on-site landfill. 488

(d) The IPA, under separate contract, will periodically pick up all scrap, trash, waste, and other construction debris in the general plant site as determined by the Engineer. However, the Contractor shall be responsible for the cleanliness of his work area as specified. 490
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6.8.2 Fire Protection: Only work procedures which minimize fire hazards to the extent practicable shall be used. 495

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Combustible debris and waste materials will be collected and removed to the on-site landfill each day by others under separate contract. Fuels, solvents, and other volatile or flammable materials shall be stored away from the construction and storage areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Contractor throughout the construction period. The Contractor shall follow the recommendations of the AGC Manual of Accident Prevention in Construction regarding fire hazards and fire prevention.	496 497 498 500 501 502 503
Untreated canvas, paper, plastic, and other flammable flexible materials shall not be used on the site for any purpose. If such materials are on equipment or materials which arrive at the site, they shall be removed and replaced with an acceptable covering before storing or moving into the construction area.	505 506 507 508
Corrugated paper and fiberboard cartons shall not be used in the construction area for the storage or handling of materials. If such cartons do arrive in the construction area, they shall be immediately unpacked and removed from the plant site. Flexible materials for covering shall be waterproof and flame resistant.	510 511 512 513 514
Formwork, scaffolding, planking, and similar materials which are combustible but which are essential to execution of the work shall be treated for fire resistance or otherwise protected against combustion resulting from welding sparks, cutting flames, and similar fire sources.	516 517 518
Temporary heating facilities shall not be left unattended.	520
The Contractor's supervisory personnel and a sufficient number of workmen shall be instructed in proper methods for extinguishing fires and shall be assigned specific fire protection duties. When trained personnel leave the job, new personnel shall be trained in their duties. All workmen shall be instructed in the selection and the operation of each type of fire extinguisher for each type of fire which might be encountered.	522 523 524 525 526
The Contractor shall provide adequate fire protection equipment in each warehouse, office, and other temporary structures, and in each work area he is occupying as specified herein. Access to sources of fire water shall be identified and kept open at all times. Suitable fire extinguishers shall be	528 529 530 531

provided in enclosed areas, in areas which are not accessible to fire water, or in areas which may be exposed to fire that cannot be safely extinguished with water. Each fire extinguisher shall be of a type suitable for extinguishing fires which might occur in the area in which it is located. In areas where more than one type of fire might occur, the type of fire extinguisher required in each case shall be provided. Each extinguisher shall be placed in a convenient, clearly identified location which will most likely be accessible in the event of fire.

The fact that the Engineer has inspected the fire protection shall not relieve the Contractor from responsibility for the above fire protection requirements.

The IPA will furnish a construction fire protection system consisting of fire water storage, fire pumps, piping, hydrants, accessories, fire station, and a fire pumper truck. personnel to operate the fire pumper truck will be furnished by the IPA under separate contract. The Contractor shall furnish all other personnel and equipment including fire extinguishers, and the Contractor shall be responsible for providing adequate fire protection.

6.9 Welding Facilities: The IPA will furnish and install a centralized welding power system consisting of constant potential d-c buses of both straight and reverse polarity and outlets. The Contractor shall furnish individual welding control units with input leads and equipment required for his use. Individual welding machines shall be provided by the Contractor for welding operations conducted remote from the generation building area.

Specialized welding which cannot be performed using the IPA's central welding facilities shall be performed by the Contractor using his own equipment.

7. Other Services Furnished by the IPA: The IPA will furnish services without charge to the Contractor at the plant site as follows:

(a) Water for hydro tests and distilled water and feedwater chemicals for hydro tests and preliminary operations.

(b) Acid cleaning of the boiler during preliminary operations.

(c) Personnel to operate the boiler.

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(d) Steam, fuel, and lubricants required for preliminary operation.	569
(e) Use of yard for storage of miscellaneous parts, yard trackage, and yard engine for spotting cars. All car spotting not performed by the railroad will be provided by the IPA.	571 572
(f) Parking for construction personnel.	575
(g) Provide and maintain site perimeter fencing and install and relocate temporary fencing and barriers as required.	577 578
(h) Periodic snow removal services as required.	580
(i) Operate and maintain a first aid station and ambulance services.	582
(j) Provide railroad sidings in the general vicinity of the plant site and into the boiler cavity. The railroad sidings will be used by other contractors at the plant site. The Contractor shall not interfere with the operations of these contractors using these railroad sidings.	584 585 586
The above services will be available at points designated by the Engineer. Before making shipment, the Contractor shall inform himself of the status of the above services with particular regard as to availability, voltages, pressure, and quantities. All matters pertaining to the above services shall be subject to the approval of the Engineer whose decision shall be final.	588 589 590 591 592
<u>8. Receiving, Handling, and Storage:</u> The Contractor shall promptly receive, unload, and place into storage or construction all equipment, materials, and supplies furnished under these specifications as they arrive at the plant site.	595 596
<u>8.1 Receiving:</u> Upon arrival at the plant site, the Contractor shall examine all shipments for shortages, discrepancies, or damage. He shall prepare a receiving report itemizing the material received and submit it to the Engineer. The receiving report shall be on a form supplied by, and in the number of copies required by, the Engineer.	599 601 602
<u>8.2 Handling:</u> The Contractor shall be responsible for any damage to equipment and materials while in his custody.	605

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The Contactor shall unload all carriers promptly and shall pay any demurrage incurred. 607

Materials shall be handled with due care to prevent damage or loss. 609

8.3 Storage: All equipment, materials, and supplies not immediately incorporated in the work shall be placed in storage. Storage areas will be allocated and assigned by the Engineer. The storage areas shall be kept neat and orderly at all times. 612
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[REDACTED] 616
[REDACTED] 617
[REDACTED] 618
[REDACTED] 619

9. Scaffolding: The Contractor shall furnish all scaffolding, staging, ladders, flooring, runways, and any other temporary construction required for the execution of his work. 622
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All scaffolding, runways, and other temporary construction shall be self-supporting throughout and shall be rigidly built so as to support safely the weight of all materials, apparatus, equipment, and construction personnel to be placed thereon and as required by federal, state, and local laws. 625
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10. Progress Reports: Once a month beginning with the start of erection, the Contractor shall furnish 8 copies of a progress report transmitted by letter to the Project Manager. 630
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The report shall show the actual or estimated date of the start and completion of each principal phase of the Boiler Unit erection the Contractor is to perform. The percentage of the above operations completed shall also be shown. 633
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The information given on a current report for all operations relating to each major phase of erection shall be completed and updated to reflect previously completed work so that it will not be necessary to refer to prior reports. 637
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In the event that progress reports are not submitted or do not present the actual status of the work as required by the Project Manager, the Project Manager will take any necessary action to secure the information. 641
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11. Permanent Elevators Used for Construction: 645
permanent elevators will be erected early by the IPA for use 646
during construction. The Engineer will coordinate and control 647
the use of the permanent elevators used during construction.
Construction use of permanent elevators for each Boiler Unit 648
will terminate upon boil out of the respective Boiler Unit, 649
except for elevators located in the control area. All other 650
elevators and equipment including temporary construction
elevators, if required, shall be furnished by the Contractor. 651
12. Facilities Furnished by IPA: The IPA will 654
provide in due time adequate foundations, foundation bolts, and 655
structural steel or other equipment not supplied by the
Contractor hereunder but required for a continuous and orderly 656
erection program. This will include, where applicable, 657
permanent walkways, flooring, and stairways. On larger boiler
installation, the site shall be considered ready for the start 658
of erection when walkways and stairways are in place from ground
level to the upper level and the Contractor has set rigging in 659
place ready to raise materials. The steel and platforms as 660
provided by the IPA will be in compliance with OSHA Standards.
- The Contractor shall, upon final design of the 662
equipment to be installed hereunder, indicate to the Engineer 663
all "leave out" steel required so that an orderly erection
sequence can proceed. The Contractor shall not include the 664
installation of this steel in the quoted prices. The IPA will 665
install the "leave out" steel at no expense to the Contractor or
an extra work order, in accordance with Subarticle 1.3 of 666
Division E2, will be issued to cover this added scope.

<u>PART G - DETAILED SPECIFICATIONS</u>	16
<u>DIVISION G1 - STANDARDS, TECHNICAL DEFINITIONS,</u>	18
<u>INSPECTIONS, AND TESTS</u>	19
1. <u>Standards:</u> The Boiler Units furnished under these specifications shall be designed, constructed, and tested to meet all of the applicable requirements of the following standards, all as last revised and in effect as of June 2, 1981, unless stated otherwise in these specifications:	23
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Air Movement and Control Association (AMCA)	28
American Society of Mechanical Engineers (ASME)	29
American Society for Testing and Materials (ASTM)	30
American National Standards Institute (ANSI)	31
American Institute of Steel Construction (AISC)	32
American Welding Society (AWS)	33
American Gear Manufacturers Association (AGMA)	34
Anti-Friction Bearing Manufacturers Association (AFBMA)	35
Factory Mutual (FM) System	36
Federal Occupational Safety and Health Standards (OSHA)	37
Institute of Electrical and Electronic Engineers (IEEE)	38
Instrument Society of America (ISA)	39
Insulated Power Cable Engineers Association (IPCEA)	40
Manufacturers Standardization Society (MSS)	41
National Board of Fire Underwriters (NBFU)	42
National Electrical Code (NEC)	43
National Electrical Manufacturers Association (NEMA)	44
National Electrical Safety Code (NESC)	45
National Fire Protection Association (NFPA)	46
National Insulation Manufacturers Association (NIMA)	47
Scientific Apparatus Makers Association (SAMA)	48
Steel Structures Painting Council (SSPC)	49
Tubular Exchanger Manufacturers Association (TEMA)	50
Underwriters' Laboratories, Inc. (UL)	51
Uniform Building Code (UBC)	52
The Boiler Units shall be in accordance with all applicable requirements of Section I, Power Boilers, of the ASME Boiler and Pressure Vessel Code and shall be so stamped. The Boiler Units shall also be in accordance with all rules, regulations, and standards of the Industrial Commission of Utah, Safety Division, and the Utah Code, Volume 4B, Chapter 7, Sections 35-7-5 through 35-7-9. Piping and valves not covered by this code shall comply with ANSI B31.1. Piping and valves covered by both codes shall be governed by the more restrictive code.	55
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Coal handling, piping, burners, furnace, and controls 62
shall be in accordance with National Fire Protection Association 63
National Fire Codes, NFPA 85E, NFPA 85F, and NFPA 85G.

Structural steel and suspension steel design, 65
material, and workmanship shall be in accordance with the 66
Specifications and Code of Standard Practice of the AISC.

If there is an overlapping or conflict among the 68
requirements or these specified codes and standards, or a 69
conflict between the requirements of these specified codes or
standards and these specifications, such conflict shall be 70
reported in writing to the Project Director. The Project 71
Director will resolve the conflict.

2. Technical Definitions: The following technical 74
terms when used in these specifications shall be understood to
have the following respective meanings: 75

(a) Ready for Boilout: The Boiler Unit is 78
completed to the extent that the boiler (1) is ready to be
chemically cleaned in accordance with the manufacturer's 79
recommendations, (2) checkout of all fuel oil firing equipment
has been completed, (3) all necessary coal firing equipment is 80
installed, (4) all necessary boiler insulation and casing is 81
installed, (5) all necessary fans required for boilout are
coupled to their motors and are balanced and ready for
operation, (6) air heater sootblowers are installed and ready 82
for operation, (7) air heaters have been run and are ready for 83
operation, and (8) controls and instrumentation required for
boilout are complete, checked, and ready for in-service use.

(b) Furnace Plan Area: The horizontal plan area 86
bounded by the enclosure wall tube centerlines at the elevation
of the top burner, in units of square feet. 87

(c) Furnace Heat Available: The higher heating 90
value of the fuel actually burned plus the sensible heat in the
combustion air minus (1) the unburned combustibles, (2) latent 91
heat of the water in the fuel and that formed by the combustion
of hydrogen in the fuel, (3) and 1/3 the radiation and 92
unaccounted for losses, all above 80F, in units of Btu/hour.

(d) Furnace Plan Heat Release Rate: Higher 95
heating value of the fuel times the pounds of fuel per hour
divided by Furnace Plan Area, in units of Btu/hour/square foot.

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3. Inspections and Tests by the Contractor: The Contractor shall furnish, at his own expense, an inspector approved under the ASME Boiler and Pressure Vessel Code, who shall make all inspections, tests, and stampings required under such code. The Contractor shall furnish the IPA with 5 copies of all ASME First Data Reports.

All tests required under this Article shall be witness tests.

In addition to the tests required under the Boiler and Pressure Vessel Code, the Contractor shall make tests including the following:

(a) Shear wave ultrasonic test of welds attaching nozzles 10 inches od or larger to drums or headers. Such tests shall be in accordance with ASME Power Boiler Code, Section I, Part PW-52. *Y/LADWP inspection: To Dennis Coleman + telecon 5/31/83*

(b) Tests on all valves 3 inches or larger in accordance with ANSI B16.34, as last revised.

(c) Inspection of fit-up of each primary air fan rotor before welding.

(d) Magnetic particle examination of each completed primary air fan rotor in accordance with ASTM E 109.

(e) Radiographic examination of shop pressure welds beyond those required by the Contractor's quality assurance program when requested by the Engineer at the unit price quoted in the Proposal Schedule. Radiographic technique and acceptance level criteria shall be per ASME Boiler and Pressure Vessel Code except where specifically approved by the Engineer. Repair and radiographic examination of defective welds so revealed shall be at the Contractor's own expense.

(f) If the contract includes erection of the Boiler Units by the Contractor, the Contractor shall make radiographic examination of not less than 10 percent of the total field welds of tubes 3-inch nominal pipe size or less when the welds form a part of the furnace waterwalls or a part of the superheater or reheater sections. The Contractor shall also make additional radiographic examinations of field welds when requested by the Engineer at the unit price quoted in the Proposal Schedule. Radiographic technique and acceptance level criteria shall be per ASME Boiler and Pressure Vessel Code except where specifically approved by the Engineer. When

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optional radiographs show defects, the Contractor shall bear all costs for such additional radiographs, the repairs, and the radiograph after repairs. 131

All radiographic examination film shall be subject to approval of the Engineer as to compliance with these specifications. 133 134

All pressure tubes in the boiler shall be ultrasonically examined. 136

All nondestructive examination and acceptance levels shall be governed by the applicable section of the ASME Boiler and Pressure Vessel Code regardless of whether the examination is required by the Code or at the Engineer's option. 138 139 140

All panel wall tube welds shall be fluoroscope examined. If for any reason the fluoroscope is unavailable, then weld quality shall be monitored by radiography of at least 5 percent of each welder's work. If the rejection rate exceeds the Contractor's standard acceptance level criteria, then additional controls shall be initiated. 142 143 144 145 146

The Contractor shall have one certified copy of all required mill test reports and one copy of all purchase orders issued by the Contractor available at the point of manufacture for the Engineer. When the Engineer is not at the point of manufacture, the mill test reports and the purchase orders shall be sent to him at an address to be furnished after date of award of contract. Mill test report shall be available for all material used in pressure parts and primary air fans, and if furnished, all material used in the Boiler recirculation pumps. If mill test reports are not available for the specified fans and pumps, a physical test or chemical analysis, or both, shall be performed by the Contractor at the request of the Engineer. 148 149 150 151 152 153 154 155

4. Operating Tests: The Contractor shall submit separate written notices when each Boiler Unit is erected complete in accordance with the contract and ready for Operating Tests. 159 159

The Boiler Unit will then be operated not less than 30 days on coal-firing before Operating Tests are performed. Operating Tests and other tests will be made by the Engineer in accordance with ASME Power Test Codes to determine compliance with the contract. 161 162 163

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Calculations shall be based on ASME Thermodynamic and Transport Properties of Steam, published in 1967. 165

Before the tests are made, the Contractor shall furnish the IPA with 8 copies of all correction curves that may be necessary to correct test data to design conditions. 167 168

If a Boiler Unit fails to meet the requirements of the specifications, the Contractor shall bear the expense of all necessary corrections and subsequent Operating Tests required to prove that the Boiler Unit meets the requirements of these specifications. 170 171 172 173

5. Motor Tests and Inspection: Routine tests shall be made at the motor factory on each integral horsepower motor in accordance with NEMA MG-1 and IEEE 112A, both as last revised. 176 177

Tests performed on all motors above 300 horsepower shall be witness tests. Winding resistance measurements and vibration measurements at the bearing housings shall be performed on all motors above 300 horsepower. 179 180 181

In addition to the tests specified above, octave band sound level measurements in accordance with IEEE 85, as last revised, shall be made on each motor rated above 3,000 horsepower. 183 184

Five certified copies of all test reports on motors shall be furnished to the IPA. 186

The IPP will field test the 6,600-volt rated motors by applying a d-c Acceptance Proof Test voltage of 10 kV, applied in accordance with the IEEE 95, as last revised. The motor shall successfully withstand the test. 188 189 190

6. Burner Management Control (BMC) System Tests: If the Option for the Burner Management Control (BMC) System has been exercised, the following factory and acceptance tests shall be performed on the BMC System: 193 194

(a) Factory Tests: The following factory tests shall be witness tests: 197

(1) Electrical tests shall include functional tests on factory assemblies and point-to-point continuity checks, in accordance with the standards. High-voltage tests shall not be applied to coaxial or shielded cables and systems 199 200 201

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and equipment components <u>not</u> designed for such tests. <u>The</u>	203
Contractor shall verify which instruments and control equipment	
can safely withstand high-voltage tests.	204
(2) System functional simulation.	206
<u>After</u> these tests have been completed and all	209
corrections and modifications resulting from these tests have	
been made so that the system complies with the requirements of	210
the specifications, <u>no</u> further modifications shall be made	211
without the written approval of the Engineer.	
(b) <u>Acceptance Tests:</u>	213
(1) Acceptance tests shall consist of a	215
complete check out of the control system, control panel <u>inserts</u> ,	216
and all other related equipment furnished.	
(2) Acceptance tests shall include a point-by-	218
point check out of all systems to verify input/output <u>values</u> and	219
functions. The installed systems shall be calibrated and all	220
functions specified shall be performed using actual or simulated	
system inputs.	
(3) Check out shall be performed after the	222
peripheral equipment, control panels, field <u>instruments</u> , control	223
module cabinets, and all other related equipment are assembled	
and installed, all <u>interconnecting</u> cables are connected, and all	224
field terminations have been made. <u>Such</u> check out shall be made	225
in the presence of the Engineer and shall serve as a part of the	
operating personnel's training program.	226
7. <u>Welder Qualification:</u> <u>Welds</u> shall be made only by	229
welders and welding operators who have been previously qualified	
by tests to perform the type of work required as prescribed in	231
the Standard Code for Welding in Building Construction of the	
American Welding Society and the ASME Code. <u>Copies</u> of all	232
welder qualifications shall be furnished to the Engineer.	
8. <u>Inspection of Surface Preparation and Painting:</u>	234
Surface preparation and painting of all structural steel and	235
miscellaneous iron and steel shall be subject to inspection by	236
the Engineer.	
Conformity to the specified dry-film thickness of the	238
coating material shall be checked with Mikrotest, Elcometer, or	239
an equivalent nondestructive gauging instrument.	

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<u>9. ASME Performance Test:</u>	The performance test shall	242
	be the abbreviated heat loss method in accordance with ASME PTC	
	4.1, -1964, and as specified hereinafter.	243
<u>9.1 Information Furnished by Contractor:</u>	The	246
	Contractor shall furnish test grids for oxygen and gas	
	temperature measurements at the economizer, the primary air	247
	heater, and the secondary air heater.	
<u>9.2 Agreement on Items in Section 3 of PTC 4.1:</u>	The	250
	following Items in Section 3 of PTC 4.1 are agreed to:	
<u>Item</u>		253
<u>(Par. No.)</u>	<u>Agreement</u>	254
3.01.01.1	General, method shall be the	256
	abbreviated heat loss method.	257
3.01.01.2	No heat credits shall be measured.	259
3.01.01.3	No heat credits shall be assigned.	261
3.01.01.4	Carbon losses shall be included.	263
3.01.01.5	Assigned heat losses shall be:	265
	(a) Sensible heat in the fly ash.	267
	(b) Radiation to the ash pit.	269
	(c) Radiation heat loss in accordance	271
	with ABMA Standard Radiation	272
	Loss Chart, Fig. E of PTC 4.1.	273
	The total of (a) and (b) above	274
	shall not exceed 0.5 percent.	275
3.01.01.6	Permissible deviation in efficiency	277
	between duplicate tests shall be	278
	0.5 percent.	279
3.01.03	Superheat and reheat steam temperatures	281
	shall be 1005F plus or minus 10F.	282
	Air heater leakage shall be corrected	283
	to the specified value, if required.	284
3.01.06	The official test point shall be	286
	maximum capacity.	287

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Item (Par. No.)	Agreement	289 290
3.01.07	Cleanliness of the unit shall be achieved by using the normal sootblowing cycle.	292 293 294
3.01.10	Fuel sampling shall be one quart from each feeder, and samples shall be quartered. Analysis shall be in accordance with ASTM standards.	296 297 298 299
3.01.13	Test results shall be reported as computed from test observations with proper correction for calibrations.	301 302 303
3.01.14	Distribution of fuel refuse quantities between the boiler and stack shall be 10 percent and 90 percent, respectively. The boiler 10 percent shall be broken down by assuming 70 percent in the hopper and 30 percent in the economizer hopper.	305 306 307 308 309 310 311
3.01.15	Corrections to be made for deviation from specified operating conditions shall be made in accordance with the PTC 4.1.	313 314 315 316
9.3 <u>Agreement on Remaining Items in Section 3 of PTC 4.1:</u>		319
Agreement on the remaining Items in Section 3 of PTC 4.1 shall be reached prior to testing.		321

PART G - DETAILED SPECIFICATIONS 15

DIVISION G2 - CONTRACT ITEMS 17

General: The Contractor shall furnish and deliver 21
for the IPA, complete and ready for Operating Tests, 4 Boiler
Units.

Each Boiler Unit furnished hereunder shall be complete 23
with the following and as further specified in these 24
specifications:

(a) Water-cooled furnace walls. 26
(b) Steam drums and headers. 28
(c) Superheater with an auxiliary steam 30
connection.

(d) Reheater. 32

(e) Economizer. 34

(f) Safety and electromatic relief valves. 36

C.O. #11 R-1
ITEM 3(a) (g) Two regenerative secondary air heaters complete with 38
air heater soot blowers and fire detection and
suppression system."

(h) Sootblowing systems using steam. 40

C.O. #11 R-1
ITEM 3(b) (i) Primary air system including fans, motors, 42
regenerative heaters, soot blowers, and fire
detection and suppression system."

following: (j) Coal pulverizing equipment including the 44

(1) Pulverizers. 46

(2) Gravimetric coal feeders with control 48
cabinets.

(3) Piping and valves from coal silos to coal 50
feeders.

(4) Piping from coal feeders to the coal 52
pulverizer.

(k) Ducts complete with dampers, expansion joints 54
and hangers for the following:

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

(1) Air ducts, as follows:	56
[a] Air heaters to windbox.	58
REVISED PER C.O. #11 R-1 ITEM B(a) → [b] Primary air fan to air heaters."	60
DELETED PER C.O. #11 R-1 ITEM B(b) → [c] Air preheater coils to air heaters.	62
[d] Air heaters to pulverizers.	64
[e] Tempering air to pulverizers.	66
PER C.O. #2 ITEM 4 burners. → [f] FORCE DRAFT FAN DISCHARGE DAMPER TO AIR HEATERS	68
(2) Coal-air ducts from the pulverizers to the	68
PER C.O. #3 ITEM 4(a) → "(3) Flue gas ducts from the boiler to the fabric filter inlets."	70
(1) Hopper, below economizer.	72
(m) Windboxes.	74
(n) Control drives.	76
(o) Thermal insulation with aluminum lagging.	78
(p) Air systems, as follows:	80
(1) Seal air.	82
(2) Ignition air.	84
(3) Flame scanner air.	86
(q) Valves and accessories.	88
(r) Firing equipment, as follows:	90
(1) Coal burners.	92
(2) No. 2 fuel oil warm-up burners, if required.	95
(3) No. 2 fuel oil ignitors.	98
(4) Dampers.	100
(5) Power positioners.	102
(6) Ignitor proving.	104

(n) Coal ash outlet at the pulverizer reject opening, economizer ash hopper outlets, and the furnace hopper bottom at the ash hopper seal plate. 147
148

PER C.O. #3
ITEM 4E (o) Ash and wash water outlets on the air heater to fabric filter ductwork." 150

PER C.O. #2 (p) Sampling point, drain, blowdown, and electromatic relief valve outlets; electromatic relief stop valve inlets; superheater safety and reheater safety valve inlets and outlets and all other safety valve outlets; superheater vent and reheater vent valve inlets and outlets, and all other vent valve outlets; and superheater nitrogen valve inlet and outlet." 152

(q) If the Option for the Burner Management Control System (BMC) is exercised, then the terminal points shall be the BMC System sensors and control bench mounted control panel. 154
155

PER C.O. #3
ITEM 1a (r) One scrubber flue gas reheater soot blower steam outlet connection terminating outside the boiler casing and downstream of a manually-operated stop valve and a motor-operated stop valve."

PER C.O. #3
ITEM 2b (s) One compressed air inlet connection for each of the furnace flame viewing television cameras, each terminating at a manually-operated isolation valve; and all furnace flame viewing television system electrical component connections terminating in a junction box."

PER C.O. #3
ITEM 9 (s) (T) Oil-electric ignition system control valve inlets and outlets, and their associated isolation valve inlets and outlets."

PER C.O. #11
ITEM 3b (u) (v) One water inlet connection for each of the air heater fire suppression systems, each terminating at a manually-operated isolation valve; and all fire detection and suppression system electrical component connections terminating in a junction box."

<u>PART G - DETAILED SPECIFICATIONS</u>	15
<u>DIVISION G3 - DETAILED REQUIREMENTS FOR ITEM 1</u>	17
1. <u>General:</u> The requirements hereinafter refer to one Boiler Unit and shall also apply to each of 4 identical Boiler Units furnished under these specifications.	21 22
The term "Boiler" or "Boiler Unit", as used in these specifications, shall be considered to mean a complete steam generating unit.	24 25
The Contractor shall furnish and deliver all necessary equipment for a complete installation unless stated otherwise herein.	27 28
The Contractor shall design the boiler using designs and design criteria which have margins of safety proven by past performance and shall furnish equipment which has demonstrated reliable operation.	30 31
The boiler shall be designed as follows:	33
(a) For operation at an altitude of 4,700 feet above sea level with a barometric pressure of approximately 25.18 inches Hg and an ambient temperature range of 30F below zero to 110F.	35 36
(b) To operate the constant pressure mode, the variable pressure mode, and hybrid pressure modes. In the variable pressure mode of operation, the superheater outlet pressure will be varied from approximately 630 psig to approximately 2,515 psig over the load range of 25 percent of Maximum Capacity to 100 percent of Maximum Capacity. In the hybrid pressure mode of operation, the superheater outlet pressure will be varied in any combination of variable pressure and constant pressure bounded by the above referenced variable pressure and constant pressure modes of operation. With a typical hybrid pressure mode of operation that may be used, the superheater outlet pressure will be varied from 820 psig at 25 percent of Maximum Capacity to approximately 2,515 psig at 68 percent of Maximum Capacity and will be operated at constant pressure above 68 percent of Maximum Capacity.	38 39 40 42 43 45 47 48
(c) To operate at flow rates and temperatures listed for operation at Maximum Capacity but with the inlet pressure to the economizer reduced such that the superheater outlet pressure is not greater than 2,365 psig.	50 51 52

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(d) To operate with an IPA furnished turbine by-pass system designed to maintain steam flow through the boiler including the reheater while bypassing the turbine. Such by-pass system may be used during boiler start-up, to maintain boiler operation during and after a turbine runback to any load, and to maintain boiler operation during and after a turbine trip.	54 55 56 57
(e) The flue gas temperature leaving the air heater shall be 280F±10F, corrected for air heater leakage, at Maximum Capacity when firing coal. For the purposes of design and calculations including efficiency, a flue gas temperature of 280F leaving the air heater shall be used.	59 60 61 62
(f) For extracting auxiliary steam from the boiler, as described in Article 8 of Division G3, from unit capacity of 50 percent of Maximum Capacity to Maximum Capacity, a quantity of steam which will vary from zero to 450,000 pounds per hour.	64 65 66
(g) For a reheater pressure of not less than 200 psi higher than the pressure of the steam at the reheater inlet at Maximum Capacity.	68 69
2. <u>Design Points:</u> The boiler shall be capable of operating continuously at all steam flows from cold start-up to Maximum Continuous Rating (MCR).	72 73
All specified design points and maximum and minimum parameters shall be considered at their most severe operating condition.	75 76
All ambient air calculations, including those used in efficiency calculations, shall be based on an air temperature of 60F and 60 percent relative humidity (0.0067 pound of moisture per pound of dry air).	78 79
As used elsewhere herein, the term "Maximum Capacity" shall represent the conditions below.	81

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	Maximum Capacity	85 86
Steam at superheater outlet:		88
Flow, lb/hr.....	6,100,000	90
Temperature, F.....	1,005	92
Pressure, psig.....	2,515	94
Steam at reheater inlet:		96
Flow, lb/hr.....	5,000,000	98
Temperature, F.....	620	100
Pressure, psig.....	539	102
Steam temperature at reheater outlet, F.....	1,005	104
Feedwater temperature to economizer, F.....	543	106
Desuperheater spray water temperature, F.....	390	108
Air temperature to fans, F.....	60	110
The boiler shall also be designed and capable of		114
operating continuously at the following conditions defined as		115
Maximum Continuous Rating:		

	Maximum	119
	<u>Continuous Rating</u>	120
Steam at superheater outlet:		122
Flow, lb/hr.....	6,600,000	124
Temperature, F.....	1,005	126
Pressure, psig.....	2,640	128
Steam at reheater outlet:		130
Flow, lb/hr.....	5,500,000	132
Temperature, F.....	1,005	134
Steam temperature at reheater inlet, F.....	630	136
Reheater heat absorption, MMbtu/hr.....	1,100	138
Feedwater temperature to economizer, F.....	555	140
The boiler shall be provided with the following features:		144
(a) Pulverized coal-fired; dry bottom furnace; balanced draft; single reheat; drum-type design.		146
(b) Designed for indoor service. All joints, including insulation covering, shall be weathertight.		149
(c) Openings shall be provided to ventilate all cavities for inspection and repair.		151
(d) Provisions shall be made to drain, by gravity, all waterwall and drainable pressure parts within 2 hours.		153
(e) Hinged doors shall be located symmetrically about the boiler to provide easy access to all parts of the boiler for inspection and repair.		155 156
(f) All tubes, nozzles, and connections to drums and headers shall be strength welded. All tubing in the boiler shall be seamless.		158 159
(g) All parts of the boiler to which the IPA will connect shall be designed to be brought outside the setting by		161

the Contractor or outside an area enclosed by boiler equipment.	162
All piping connections shall be prepared for welding.	163
(h) The boiler parts shall be arranged to avoid interferences and inaccessibilities of equipment which would hamper normal operating and maintenance procedures.	165
(i) Seals for openings in the boiler shall be welded gastight where practicable. Pulverizers, feeders, damper shafts, and other equipment subject to leakage of pressurized flue gases or air coal mixtures shall be equipped with pressure seals. The IPA will furnish air piping or ducting to the pressure seals.	166
(j) All parts exposed to flue gas shall be designed to resist attack by sulfur and alkali metal compounds.	168
(k) All component parts downstream of the economizer shall be designed for a temperature at least 50F higher than the maximum temperature of the gases leaving the economizer.	169
(l) Designed so that the unit can operate at not less than 60 percent of Maximum Capacity with any one air heater, forced draft fan, or primary air fan out of service.	170
(m) Designed to reduce load to a load not greater than 50 percent of Maximum Capacity from any load greater than 50 percent of Maximum Capacity at the rate of not less than 5 percent of Maximum Capacity per minute without lifting safety valves, without tripping pulverizers, and without the use of supplemental fuel.	171
(n) The burner level heat release rate shall be not more than 1,600,000 Btu per hour per square foot. The burner level heat release rate shall be calculated as follows: The typical higher heating value for Coal B times the pounds of fuel burned at MCR divided by the product of the width and depth of the furnace at the top burner level.	176
(o) The maximum gas side pressure drop between the furnace and the air heater outlet shall be not more than 12 inches wq at MCR.	177
(p) Furnace platens or extended surface shall be not less than 80 feet above the top burner centerline.	179
(q) The gas temperature entering close space platen or pendant surfaces shall be not greater than 1900F at	182

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DETAILED REQUIREMENTS FOR ITEM 1

MCR. The gas temperature, as measured by high velocity thermocouple (HVT), shall be the maximum temperature.	199
The Contractor shall furnish all valves, piping, fittings, and insulation required to make connections between equipment which the Contractor provides, except as specified in Subarticle 22.6 of this Division.	201 202
The Contractor shall furnish all <u>replacement gaskets</u> required for installation following preliminary boiler operations consisting of hydrostatic test, boilout, and acid cleaning.	204 205
The IPA will furnish and install manually operated block valves, piping, fittings, and insulation between the Contractor's equipment and the equipment furnished by the IPA, except as specified in <u>Article 27</u> of this Division.	207 208 209
<u>3. Fuels:</u> The coal analyses for Coal Reserves A through G, which are the fuels to be supplied by the IPA to the boiler, are shown on Pages G3-7 through G3-13. The analyses for each coal reserve includes an analysis which is typical for that reserve and 2 additional analyses which represent the range of individual characteristics or constituents that can reasonably be expected from the reserve. Approximately equal quantities of fuel will be purchased from each reserve.	212 214 215 217
The boiler shall be capable of complying with all requirements of these specifications when operating with coal from any of the coal reserves listed in this Article, either individually or in any combination, and with sodium oxide content to 4.5 percent in the coal ash. However, when coal from Coal Reserve F is supplied to the boiler, Coal Reserve F will not exceed 50 percent by weight of a coal mixture. The typical analysis of Coal Reserve B shall be used by the Contractor for providing performance guarantees and for providing Supplementary Data required in Subarticle 12.3 of the Execution Document. Coal Reserve B will be used by the IPA for performing guarantee tests of boiler performance.	219 220 221 222 224 225 226

COAL RESERVE A

<u>Proximate Analysis, as received, diluted</u>	Typical	Range	
Moisture	8.6	6.5	22.0
Ash	15.6	10.0	21.5
Volatile	36.0	33.2	38.2
Fixed Carbon	39.8	36.1	43.5
Btu	10,930	9,980	11,685
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic	0.19	0.04	0.25
Sulphate	0.00	0.00	0.01
Organic	0.56	0.45	0.68
Equilibrium Moisture	6.8	4.7	8.5
Grindability	46	41	52
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	2300	2110	2505
H=W	2470	2270	2700+
H=1/2W	2515	2335	2700+
Fluid	2615	2470	2700+
Oxidizing			
I.D.	2420	2220	2570
H=W	2560	2420	2700+
H=1/2W	2580	2450	2700+
Fluid	2670	2600	2700+
<u>Ultimate Analysis, diluted</u>			
Carbon	59.90	56.90	62.90
Hydrogen	4.50	4.10	4.90
Nitrogen	0.93	0.73	1.13
Chlorine	0.02	0.00	0.04
Sulfur	0.75	0.55	0.91
Ash	15.60	10.00	21.50
Oxygen	9.70	7.70	11.70
Moisture	8.60	6.50	11.00
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	0.4	0.2	1.1
Silica, SiO2	61.1	57.1	65.1
Ferric oxide, Fe2O3	4.6	3.0	8.0
Alumina, Al2O3	21.6	18.6	24.6
Titania, TiO2	1.1	0.8	1.4
Lime, CaO	4.6	2.5	6.8
Magnesia, MgO	1.0	0.7	1.3
Sulfur trioxide, SO3	2.9	1.4	4.7
Potassium oxide, K2O	1.2	0.6	1.6
Sodium oxide, Na2O	1.0	0.5	1.5
Undetermined	0.5	0.1	1.0
Free Swelling Index	--	--	--
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	14.3	8.0	19.0
Base/Acid	0.15	0.10	0.21
Na2O/MMBtu	0.14	0.06	0.26
Fe2O3/CaO	1.00	0.70	2.00
SiO2 + Al2O3/MMBtu	11.83	6.47	18.82
Fe2O3 + CaO	5.20	5.94	2.47
SiO2 X % Ash dry	0.10	0.07	0.15
M & A free Btu	14,420	--	--

COAL RESERVE P

<u>Proximate Analysis, as received, diluted</u>	<u>Typical</u>	<u>Range</u>	
Moisture	8.3	7.4	9.4
Ash	14.0	8.0	18.0
Volatile	37.1	35.0	40.0
Fixed Carbon	40.6	36.0	44.0
Btu	11,010	10,500	12,200
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic	0.18	0.11	0.25
Sulphate	0.00	0.00	0.00
Organic	0.37	0.29	0.45
Equilibrium Moisture	6.5	6.0	7.0
Grindability	48	43	53
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	2180	2075	2300
H=W	2215	2095	2340
H=1/2W	2245	2115	2380
Fluid	2330	2190	2470
Oxidizing			
I.D.	2240	2130	2355
H=W	2300	2135	2455
H=1/2W	2325	2200	2450
Fluid	2410	2255	2570
<u>Ultimate Analysis, diluted</u>			
Carbon	61.45	58.50	64.50
Hydrogen	4.56	4.26	4.86
Nitrogen	1.20	0.95	1.45
Chlorine	0.02	0.00	0.04
Sulfur	0.55	0.40	0.70
Ash	14.00	8.00	18.00
Oxygen	9.92	9.32	10.52
Moisture	8.30	7.40	9.30
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	0.3	0.1	1.0
Silica, SiO2	58.5	49.3	62.0
Ferric oxide, Fe2O3	5.9	3.9	7.9
Alumina, Al2O3	13.5	10.7	16.8
Titania, TiO2	0.7	0.5	0.9
Lime, CaO	9.3	3.9	14.6
Magnesia, MgO	2.0	0.8	3.0
Sulfur trioxide, SO3	5.9	2.9	8.9
Potassium oxide, K2O	0.9	0.6	1.3
Sodium oxide, Na2O	1.6	0.6	3.6*
Undetermined	1.1	0.3	3.0
Free Swelling Index	1.5	1.0	1.5
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	12.71	--	--
Base/Acid	0.27	--	--
Na2O/MMBtu	0.20	--	--
Fe2O3/CaO	0.63	--	--
SiO2 + Al2O3/MMBtu	9.19	--	--
Fe2O3 + CaO	15.20	--	--
SiO2 X % Ash dry	0.09	--	--
M & A free Btu	14,172	--	--

*Core samples indicate an absolute maximum of approximately 5.1 percent.

COAL RESERVE C

<u>Proximate Analysis, as received, diluted</u>			
	Typical	Range	
Moisture	10.5	9.5	11.4
Ash	7.2	6.4	8.0
Volatile	39.4	36.2	40.7
Fixed Carbon	42.6	41.8	40.0
Btu	11,577	11,427	11,727
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic	---	---	---
Sulphate	---	---	---
Organic	---	---	---
Equilibrium Moisture	---	---	---
Grindability	49	47	51
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	2140	2095	2190
H=W	2170	2110	2220
H=1/2W	2195	2130	2260
Fluid	2245	2150	2335
Oxidizing			
I.D.	2205	2145	2265
H=W	2230	2165	2295
H=1/2W	2260	2190	2330
Fluid	2310	2220	2400
<u>Ultimate Analysis, diluted</u>			
Carbon	65.43	63.16	67.70
Hydrogen	4.88	4.70	5.06
Nitrogen	1.26	1.07	1.45
Chlorine	0.01	0.00	0.02
Sulfur	0.48	0.37	0.59
Ash	7.20	6.40	8.00
Oxygen	10.24	9.66	10.82
Moisture	10.50	9.50	11.40
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	0.2	0.1	0.3
Silica, SiO2	53.6	47.4	59.8
Ferric oxide, Fe2O3	7.1	5.5	8.7
Alumina, Al2O3	13.2	10.5	15.9
Titania, TiO2	0.7	0.6	0.8
Lime, CaO	12.3	6.7	17.9
Magnesia, MgO	2.5	1.0	4.0
Sulfur trioxide, SO3	8.4	5.7	11.1
Potassium oxide, K2O	1.0	0.6	1.6
Sodium oxide, Na2O	0.5	0.4	0.6
Undetermined	0.5	0.1	0.9
Free Swelling Index			
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	6.22	5.78	6.67
Base/Acid	0.35	0.23	0.48
Na2O/MMBtu	0.031	0.021	0.041
Fe2O3/CaO	0.58	0.47	0.69
SiO2 + Al2O3/MMBtu	4.15	3.55	4.75
Fe2O3 + CaO	19.40	13.13	25.67
SiO2 X % Ash dry	0.04	0.01	0.05
M & A free Btu	14,067	---	---

COAL RESERVE D

Proximate Analysis, as received, diluted

Typical

Range

Moisture	9.8	8.4	12.1
Ash	8.8	6.5	22.0
Volatile	38.2	34.5	40.0
Fixed Carbon	43.2	39.5	45.5
Btu	11,690	10,520	12,300

Miscellaneous, undiluted

Sulfur Forms, dry basis

Pyritic	0.09	0.07	0.12
Sulphate	0.01	0.00	0.03
Organic	0.49	0.39	0.55
Equilibrium Moisture	5.6	5.0	6.6
Grindability	47	45	49

Fusion Temperatures, undiluted

Reducing

I.D.	2335	2145	2520
H=W	2355	2170	2540
H=1/2W	2380	2200	2560
Fluid	2415	2235	2600

Oxidizing

I.D.	2395	2200	2590
H=W	2415	2230	2600
H=1/2W	2435	2250	2620
Fluid	2470	2290	2650

Ultimate Analysis, diluted

Carbon	66.20	56.07	76.33
Hydrogen	4.91	4.12	5.70
Nitrogen	1.31	1.05	1.57
Chlorine	0.02	0.01	0.03
Sulfur	0.59	0.49	0.69
Ash	8.80	6.50	11.00
Oxygen	8.37	7.14	9.60
Moisture	9.80	8.40	11.20

Mineral Analysis, ignited basis, undiluted

Phos. pentoxide, P2O5	0.6	0.2	1.0
Silica, SiO2	52.6	45.1	60.0
Ferric oxide, Fe2O3	4.4	2.9	6.0
Alumina, Al2O3	22.8	15.7	29.9
Titania, TiO2	1.0	0.7	1.3
Lime, CaO	7.8	6.8	8.8
Magnesia, MgO	1.1	0.7	2.5
Sulfur trioxide, SO3	5.5	3.5	7.5
Potassium oxide, K2O	0.6	0.4	0.8
Sodium oxide, Na2O	2.6	1.3	3.9
Undetermined	1.0	0.6	1.4
Free Swelling Index	---	---	---

Calculated Values, diluted where applicable

Lbs Ash/MMBtu	7.53	4.79	10.27
Base/Acid	0.22	0.13	0.31
Na2O/MMBtu	0.20	0.11	0.29
Fe2O3/CaO	0.56	0.39	0.73
SiO2 + Al2O3/MMBtu	5.68	3.85	7.51
Fe2O3 + CaO	12.20	8.89	15.51
SiO2 X % Ash dry	0.05	0.04	0.07
M & A free Btu	14,360	---	---

*Core samples indicate an absolute maximum of approximately 5.1 percent.

COAL RESERVE E

<u>Proximate Analysis, as received, diluted</u>	<u>Typical</u>	<u>Range</u>	
Moisture	10.6	11.4	11.8
Ash	9.3	6.0	22.6
Volatile	35.8	33.0	38.0
Fixed Carbon	44.3	41.7	46.2
Btu	11,060	10,540	11,440
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic	0.09	0.02	0.40
Sulphate	0.00	0.00	0.00
Organic	0.36	0.26	0.60
Equilibrium Moisture	--	--	--
Grindability	--	--	--
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	2160	2060	2270
H=W	2180	2070	2290
H=1/2W	2195	2080	2310
Fluid	2220	2100	2340
Oxidizing			
I.D.	2190	2095	2285
H=W	2210	2110	2305
H=1/2W	2225	2120	2325
Fluid	2255	2150	2360
<u>Ultimate Analysis, diluted</u>			
Carbon	63.66	60.67	66.67
Hydrogen	4.37	4.07	4.67
Nitrogen	1.05	0.87	1.27
Chlorine	0.02	0.00	0.03
Sulfur	0.44	0.29	0.69
Ash	9.30	6.0	12.60
Oxygen	10.56	10.06	11.06
Moisture	10.6	11.4	11.8
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	0.20	0.10	0.30
Silica, SiO2	51.00	44.00	58.00
Ferric oxide, Fe2O3	5.20	3.20	6.60
Alumina, Al2O3	13.00	11.00	15.00
Titania, TiO2	0.70	0.60	0.80
Lime, CaO	14.60	5.40	16.00
Magnesia, MgO	3.00	1.30	4.50
Sulfur trioxide, SO3	7.80	6.00	9.60
Potassium oxide, K2O	0.60	0.35	1.00
Sodium oxide, Na2O	3.10	0.20	4.70*
Undetermined	0.80	0.00	2.00
Free Swelling Index	--	--	--
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	8.41	5.80	11.02
Base/Acid	0.41	0.25	0.57
Na2O/MMBtu	0.26	0.13	0.37
Fe2O3/CaO	0.36	0.22	0.50
SiO2 + Al2O3/MMBtu	5.35	3.06	7.70
Fe2O3 + CaO	19.80	14.10	25.50
SiO2 X % Ash dry	0.05	0.03	0.07
M & A free Btu	13,310	--	--

*Core samples indicate an absolute maximum of approximately 5.1 percent.

COAL RESERVE F

<u>Proximate Analysis, as received, diluted</u>	<u>Typical</u>	<u>Range</u>	
Moisture	<u>18.8</u>	<u>13.00</u>	<u>21.00</u>
Ash	<u>7.8</u>	<u>5.0</u>	<u>12.0</u>
Volatile	<u>35.5</u>	<u>33.3</u>	<u>37.5</u>
Fixed Carbon	<u>37.9</u>	<u>35.9</u>	<u>39.9</u>
Btu	<u>9,662</u>	<u>9,400</u>	<u>10,000</u>
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic	<u>---</u>	<u>---</u>	<u>---</u>
Sulphate	<u>---</u>	<u>---</u>	<u>---</u>
Organic	<u>---</u>	<u>---</u>	<u>---</u>
Equilibrium Moisture	<u>---</u>	<u>---</u>	<u>---</u>
Grindability	<u>55</u>	<u>53</u>	<u>57</u>
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	<u>2250</u>	<u>2045</u>	<u>2300</u>
H=W	<u>2350</u>	<u>2155</u>	<u>2400</u>
H=½W	<u>2380</u>	<u>2210</u>	<u>2430</u>
Fluid	<u>2400</u>	<u>2315</u>	<u>2525</u>
Oxidizing			
I.D.	<u>---</u>	<u>---</u>	<u>---</u>
H=W	<u>---</u>	<u>---</u>	<u>---</u>
H=½W	<u>---</u>	<u>---</u>	<u>---</u>
Fluid	<u>---</u>	<u>---</u>	<u>---</u>
<u>Ultimate Analysis, diluted</u>			
Carbon	<u>55.60</u>	<u>52.00</u>	<u>58.00</u>
Hydrogen	<u>4.13</u>	<u>3.80</u>	<u>4.40</u>
Nitrogen	<u>0.86</u>	<u>0.70</u>	<u>1.00</u>
Chlorine	<u>0.04</u>	<u>0.00</u>	<u>0.05</u>
Sulfur	<u>0.93</u>	<u>0.80</u>	<u>1.10</u>
Ash	<u>7.81</u>	<u>5.00</u>	<u>12.00</u>
Oxygen	<u>11.83</u>	<u>11.30</u>	<u>12.30</u>
Moisture	<u>18.80</u>	<u>13.00</u>	<u>21.00</u>
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	<u>0.2</u>	<u>0.1</u>	<u>0.4</u>
Silica, SiO2	<u>41.7</u>	<u>45.0</u>	<u>38.0</u>
Ferric oxide, Fe2O3	<u>7.0</u>	<u>5.5</u>	<u>8.5</u>
Alumina, Al2O3	<u>26.4</u>	<u>23.0</u>	<u>29.0</u>
Titania, TiO2	<u>1.7</u>	<u>1.5</u>	<u>1.9</u>
Lime, CaO	<u>6.8</u>	<u>6.3</u>	<u>7.3</u>
Magnesia, MgO	<u>1.4</u>	<u>1.2</u>	<u>1.6</u>
Sulfur trioxide, SO3	<u>10.6</u>	<u>8.6</u>	<u>12.6</u>
Potassium oxide, K2O	<u>0.2</u>	<u>0.1</u>	<u>0.3</u>
Sodium oxide, Na2O	<u>3.0</u>	<u>1.0</u>	<u>3.5</u>
Undetermined	<u>1.0</u>	<u>0.5</u>	<u>2.0</u>
Free Swelling Index	<u>0</u>	<u>0</u>	<u>0</u>
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	<u>8.07</u>	<u>---</u>	<u>---</u>
Base/Acid	<u>0.26</u>	<u>---</u>	<u>---</u>
Na2O/MMBtu	<u>0.24</u>	<u>---</u>	<u>---</u>
Fe2O3/CaO	<u>1.03</u>	<u>---</u>	<u>---</u>
SiO2 + Al2O3/MMBtu	<u>5.50</u>	<u>---</u>	<u>---</u>
Fe2O3 + CaO	<u>13.80</u>	<u>---</u>	<u>---</u>
SiO2 X % Ash dry	<u>0.04</u>	<u>---</u>	<u>---</u>
M & A free Btu	<u>13,160</u>	<u>---</u>	<u>---</u>

COAL RESERVE G

<u>Proximate Analysis, as received, diluted</u>			
	Typical	Range	
Moisture	6.5	5.7	7.1
Ash	15.8	10.7	20.8
Volatile	33.2	29.8	36.8
Fixed Carbon	44.5	41.1	48.1
Btu	11,205	10,375	12,055
<u>Miscellaneous, undiluted</u>			
Sulfur Forms, dry basis			
Pyritic			
Sulphate			
Organic			
Equilibrium Moisture	4.2	3.5	5.0
Grindability	44	41	46
<u>Fusion Temperatures, undiluted</u>			
Reducing			
I.D.	2330	2200	2460
H=W	2400	2265	2540
H=1/2W	2475	2335	2620
Fluid	2560	2430	2690
Oxidizing			
I.D.	2395	2265	2530
H=W	2465	2330	2600
H=1/2W	2525	2400	2650
Fluid	2595	2480	2715
<u>Ultimate Analysis, diluted</u>			
Carbon	63.40	59.4	67.4
Hydrogen	4.32	4.22	4.52
Nitrogen	1.17	1.02	1.32
Chlorine	0.03	0.00	0.06
Sulfur	0.61	0.46	0.76
Ash	15.80	10.7	20.80
Oxygen	8.17	7.57	8.77
Moisture	6.50	5.7	7.1
<u>Mineral Analysis, ignited basis, undiluted</u>			
Phos. pentoxide, P2O5	0.6	0.2	1.0
Silica, SiO2	58.7	53.7	63.7
Ferric oxide, Fe2O3	3.4	2.6	4.2
Alumina, Al2O3	20.7	17.0	25.0
Titania, TiO2	0.8	0.7	0.9
Lime, CaO	6.6	4.6	8.6
Magnesia, MgO	1.6	0.9	2.3
Sulfur trioxide, SO3	5.3	3.3	7.3
Potassium oxide, K2O	0.7	0.3	1.1
Sodium oxide, Na2O	0.9	0.5	1.3
Undetermined	0.7	0.1	1.3
Free Swelling Index	3	2	4
<u>Calculated Values, diluted where applicable</u>			
Lbs Ash/MMBtu	14.10	8.84	20.58
Base/Acid	0.16	0.12	0.21
Na2O/MMBtu	0.13	0.05	0.30
Fe2O3/CaO	0.52	0.27	0.92
SiO2 + Al2O3/MMBtu	11.20	6.49	17.06
Fe2O3 + CaO	10.00	7.64	12.47
SiO2 X % Ash dry	0.09	0.05	0.13
M & A free Btu	14,420	--	--

*Core samples indicate an absolute maximum of approximately 5.1 percent.

The boiler shall be designed to use fuel oil for coal burner ignition. Warm-up burner fuel, if required, will be fuel oil. Fuel oil will be Grade No. 2 in accordance with ASTM D 396. 235
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4. Steam Temperature Control: The Contractor shall furnish equipment to maintain main steam and reheat steam temperatures constant at 1005F from 65 percent of Maximum Capacity to Maximum Capacity without the use of reheat desuperheating spray. 240
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In addition to the equipment necessary to control reheat steam temperature, the Contractor shall furnish spray desuperheating equipment for the reheater with sufficient capacity to maintain steam temperatures for upset conditions of boiler operation. 243
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There shall be no more than 20F difference in steam temperature between the connections for the superheater and not more than 20F difference in steam temperature between the connections for the reheater. 247
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The superheat and reheat temperatures shall be less than 150F apart under all conditions of operation at loads above 15 percent of Maximum Capacity. 250
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5. Design Pressure of Air and Gas Side of Boiler: All parts of the boiler from the air preheater coils air inlet to the air heater flue gas outlet, including the furnace, shall be designed to withstand an internal positive pressure not less than 130 percent of the pressure loss from the air preheater coils inlet to the furnace at Maximum Capacity and to withstand an internal negative pressure. The absolute value of the designed internal negative pressure shall be not less than 130 percent of the sum of 21 inches of water and the pressure loss from the furnace to the air heater gas outlet. 253
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6. Furnace: The water walls of the furnace shall be of the welded wall (membrane wall) design. 262

The furnace shall be considered as the surfaces surrounding or in the combustion chamber from the projected low point of the hopper bottom to the point where the hot gases enter convection surfaces. Tube elements spaced on less than 18-inch centers measured at right angles to the gas flow shall be considered convection surfaces. 264
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The furnace shall be designed to burn the specified fuels at all load conditions such that neither slag accumulation 269
270

DIVISION G3

DETAILED REQUIREMENTS FOR ITEM 1

nor flame impingement on cooling surfaces occur. If a furnace 271
nose arch is furnished, its upper slope shall be not less than
30 degrees from horizontal.

The furnace shall be of the dry bottom type design. 273
The furnace hopper shall have a minimum slope of 50 degrees from 274
horizontal and shall have a continuous throat opening width of 275
not less than 4 feet. A stainless steel seal plate shall be 276
included around the hopper periphery and shall be located 26
feet above grade floor level. ---

ADDED BY C.O. 2
ITEM 16

"The seal plate shall be designed for plus or minus
20 inches water pressure."

Observation doors shall be furnished, conveniently 279
located for visual inspection of all parts of the furnace and 280
all burners.

Water wall supported, air-cooled, television viewing 282
window groups shall be furnished. The window groups shall 283
consist of all equipment necessary for television viewing. The 284
television windows shall be designed for easy removal, cleaning,
and replacement. The window groups shall be designed so that 285
personnel will be protected while removing the television
windows with the boiler in service. The windows shall be 287
located so that all burners and the furnace bottom throat can be
viewed by television and so that there will be adequate space 288
for the installation and maintenance of the windows and
television cameras. ~~The Contractor shall furnish supports on~~ 289

C.O. #3

ITEM 17

"The Contractor shall furnish supports on the
water wall tubes to which television camera
mounting brackets can be connected. Television
cameras shall be furnished as specified under
Subarticle 23.11 of this division."

Each water wall header shall have a handhole near each 293
end of the header for cleaning and inspection.

Sufficient connections shall be provided to obtain 295
samples representative of all boiler water. Sample connections 296
shall be located so that solids do not enter the sample
openings.

The exterior surface of the water wall panels shall be 298
painted with a white protective coating before shipment to the 299
plant site.

The boiler circulation system shall be adequate to 301
prevent overheat type failures under all generating conditions. 302
If boiler recirculation pumps are furnished, they shall be 303
complete with motor drives and shall not limit boiler operation 304
when any one pump is out of service. All recirculation pumps 305
shall be identical with provisions for automatic and remote
manual operation. The circulation system shall be complete with 306

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

all necessary piping, valves, controls, iron oxide flushing provisions, and, if required, a complete seal water system. 307

7. Steam-and-Water Drum: All steam-and-water drums shall be interconnected. Each steam-and-water drum shall include the following: 310
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(a) Safety valves. 313

(b) Two normal level and 2 high level water gage glasses. 315

(c) Connections, in addition to code required connections, at each end of the drum as follows: 317

(1) Two for low level trip. 319

(2) One for high level trip. 321

(3) Two for control and visibility. 323

(d) Two pressure instrument connections. 325

(e) Chemical feed connections, complete with internal piping. 327

(f) Continuous blowdown, complete with internal piping arranged so that the blowdown is representative of the water containing the highest concentration of dissolved solids in the steam-and-water drum, and external piping (including drain piping from the drum to the operating floor, BRIL, and hangers) arranged so that the continuous blowdown control valve is located at the operating floor level."

C.O. #3
Item 5

(g) Vents. 333

(h) Connections for nitrogen blanketing. 335

(i) Connections for a water level recorder. 337

(j) All other connections necessary for safe and convenient operation. 339

Each drum shall be of sufficient length to accommodate all of the above nozzles and connections outside of the boiler setting. 341
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Two normal-level drum water level gages shall be furnished. These gages shall be Yarway Figure No. T-4595F, 3,000 psi, and shall have not less than 18 inches of visibility. 344
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Two high-level drum water level gages shall be furnished. These gages shall be Yarway Figure No. T-4595F, 3000 psi, and shall 347

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C.O. #2
\$37,575 (CREDIT)

have not less than 28 inches of visibility. The gages shall be 348
furnished with spare gaskets and temporary ports for use during
boiler acid cleaning. The normal-level gages shall be equipped 349
with an outdoor-type variable light source for television
viewing and be capable of being used for front viewing. All 351
gages shall be equipped with 2 chain operated valves and
sufficient chain to operate the valves from the floor below. 352
Mirrors and reflector hoods are not required. 353

Each drum shall be fitted with scrubbers and 355
separators to prevent carry-over. These scrubbers and 356
separators shall not use gaskets. The internal parts shall be 357
removable to allow for internal inspection of each drum.

The maximum total solids in the steam leaving each 359
drum shall be not more than 0.08 part per million by weight at 360
all steam flows and all operating pressures. The concentration 361
of solids in the boiler water will be approximately 50 parts per
million with no oil or organic matter present. 362

Outlet connections from each drum shall be provided 364
with saturated steam sampling nozzles arranged so that samples 365
are representative of all steam entering the superheater.

Each drum shall be provided with a manhole opening in 367
each head. Manhole plates shall be supported on suitable 368
hinges. One set of spare gaskets shall be furnished for 369
replacement of gaskets after acid cleaning operations. The 370
insulation and covering over manhole plates shall be readily
removable and replaceable.

8. Superheater and Reheater: Superheater and 373
reheater surface shall be designed to operate with each of the
specified coals at all load conditions without excessive coal- 374
ash corrosion, fouling, or erosion. No superheater nor reheater 375
surface shall be located in the furnace below the point where
combustion is complete.

Clear spacing between convection tubes shall be not 377
less than 3 inches. Where gas temperatures exceed 1,350F, clear 378
spacing between convection tubes shall be not less than 6
inches. Where gas temperatures exceed 1,750F, clear spacing 379
between convection tubes shall be not less than 7 inches. Where 380
gas temperatures exceed 1900F, clear spacing between the
superheater or reheater platens or pendants shall be not less 381
than 12 inches. All horizontal tubes in a gas pass shall have 382
constant clear spacing regardless of gas temperature change.
All tubes in a tube bank shall be in line with gas flows. Flue 384
gas average velocity through any tube bank shall be not greater

than 55 feet per second. The deviation of gas maximum velocity across a tube bank from the average velocity shall not exceed 7 percent. 385

All pendant secondary superheater and reheater lead tubes, except for furnace platens, shall be stainless steel. 387
Type 304 stainless steel shall be used where tube material temperature selection criteria of Article 10 of this Division would not otherwise require the selection of stainless steel. 388
Wall thickness of the Type 304 stainless steel tubes shall be not less than the minimum wall thickness calculated for the tubes based on the use of SA-213, Grade T11, or SA-213, Grade T22 material, the selection of which is to be made according to the same design criteria of material selection used for adjacent tubes. 389
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All horizontal tube banks shall be completely drainable. 394

Sufficient cavities shall be provided to facilitate inspection, tube replacement, and to permit the addition of any required adjustment surface to meet guarantees. 396
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- (b) Division G3, Article 8. Superheater and Reheater:
Delete the sixth paragraph and insert the following paragraph.

"Each superheater outlet header shall be provided with drains."

"The Contractor shall provide the following equipment to be installed on each of the Intermountain Power Authority's (IPA's) superheater outlet headers under separate specifications.

- (a) Electromatic relief valve or equivalent.
(b) Safety valves.
(c) Vent valves.
(d) Valve for nitrogen blanketing."

Superheater headers and steam drums shall be provided with steam outlet connections complete with manually operated stop valves. Steam from both the connections shall be delivered in a set proportion to a 400 psia auxiliary steam system header so that the total flow from both connections will be as required, at any rate from zero pounds per hour to 450,000 pounds per hour, and the mixed temperature of the steam will be 550F. 411
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The superheater and reheater shall each be provided with not less than 2 outlet connections. The outlet connections shall be SA-213, Grade T22 steel. 417
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A reheater inlet header shall be fitted with not less than 2 inlet nozzles. The inlet nozzles shall be ASTM A 106, Grade B. 420 421

"Each reheater outlet header shall be provided with drains."

C.O. #2
Item 18d

"The Contractor shall provide the following equipment to be installed on each of the IPA's reheater inlet and outlet headers under separate specifications."

(a) Safety valves.

(b) Vent valves."

C.O. #2
Item 18e

The Contractor shall provide the following connections downstream of each reheater spray desuperheater: 433

(a) One thermowell for test. 435

(b) One thermowell for control. 437

Minimum reheater tube wall thickness shall be not less than 0.180 inch. 439

The Contractor shall provide 2 thermowells in each inlet header of both the primary and secondary superheater sections. These thermowells will be used for test and indication. 441 442 443

Observation doors shall be furnished, conveniently located for visual inspection of all parts of the superheater and reheater. 445 446

9. Economizer: The economizer shall form an integral part of the boiler and shall be designed to withstand rapid changes in pressure and temperature. The economizer shall not produce steam at any boiler load nor during start-up. All tubes shall be completely drainable. Economizer headers shall be oriented so that temperatures throughout the length of each header are constant. The gas side of the economizer shall be free from plugging when burning all specified coals. All tubes shall be in line with the gas flow and shall have a constant clear spacing of not less than 3 inches. Economizer tubes shall not have spiral or radial fins. Flue gas average velocity shall be not greater than 55 feet per second. The deviation of gas maximum velocity from the average velocity shall not exceed 7 percent. 449 451 452 453 454 455 456 457 458

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DIVISION G3

Spec. 2010N
Revised May 29, 1981
DETAILED REQUIREMENTS FOR ITEM 1

Each economizer inlet and outlet header shall be provided with the following: 460

- (a) One pressure instrument connection. 462
- (b) Two thermowells for test. 464
- (c) One sample connection. 466
- (d) Drains. 468

Observation doors shall be furnished and shall be conveniently located for visual inspection of all parts of the economizer. 470
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10. Metal Selection: Metals shall be selected on the basis of maximum service conditions with allowances for corrosion and oxidation expected under all conditions of operation. 474
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Metal temperatures, taking into consideration unequal distribution of gas and steam, shall not exceed the following: 477
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<u>Material</u>	<u>ASME Specification</u>	<u>Maximum External Metal Temperature, F</u>	
		482	483
Chrome, 1/2 percent	SA-213, Grade T2	950	486
Chrome, 1-1/4 percent	SA-213, Grade T11	1,000	488
Chrome, 3 percent	SA-213, Grade T21	1,075	490
Chrome, 2-1/4 percent	SA-213, Grade T22	1,075	492
Chrome, 9 percent	SA-213, Grade T9	1,150	494
Chrome, 18-10 Ni-Ti	SA-213, Grade TP321H	1,400	496
Chrome, 18-10 Ni-Cb	SA-213, Grade TP347H	1,400	498

Carbon steel shall not be used if it will be subjected to metal temperatures above 775F and internal pressures greater than 50 psia. Carbon steel shall not be used if it will be subjected to metal temperatures exceeding 825F. If materials other than those specified above are used, the maximum design metal temperature shall be subject to approval by the Engineer as to suitability of intended service. 502
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The design stress of SA-213, Grade TP347H, shall be not greater than 95 percent of the stress allowed by Section I, Power Boilers, of the ASME Boiler and Pressure Vessel Code, for metal temperatures which exceed 1,150F.

Maximum external metal temperature shall be calculated in accordance with the procedures as shown in the Contractor's Proposal and titled Superheater and Reheater Design. Steam temperatures used to select tube materials for tubes outside of heat transfer zones, such as in the penthouse, shall be not less than the steam temperatures calculated by the referenced procedures.

All functional and stress calculations shall be checked by an independent engineer within the Contractor's company.

All hangers within areas housing boiler parts above 775F shall be designed for not less than 900F. Hanger components attached to boiler parts above 900F, or passing through insulation of these parts, shall be designed for not less than 1,000F.

11. Air Heaters: Two separate primary and 2 separate secondary air heaters shall be furnished for heating the primary and secondary air. Regenerative air heaters utilizing rotating heat transfer elements shall be furnished. The air heaters shall be vertical shaft type and shall have the air heater gas outlet and the air heater air inlet located at the bottom of the air heater.

The air heater shall be designed for future increase in the depth of the air heating elements by not less than 8 inches.

The air heater shall be of the loose pack design and fabricated of Corten steel. The hot layer and intermediate layer of the surface shall be not thinner than 22 USS gage, and the cold layer shall be not thinner than 18 USS gage.

The cold layer of surface shall be the basketed type, reversible, and designed for side removal. The cold end of the rotor encompassing the full depth of the cold layer and the cold end connecting plate shall be fabricated of Corten steel.

The flue gas ducts to the air heaters shall consist of either horizontal or vertical duct sections. The flue gas ducts to the secondary air heaters shall contain a short toggle section of approximately 16 feet in length measured at the

outside ends of the expansion joints and as shown on Drawing P23-310-36Y0 in the Contractor's Proposal. 545

IPA will furnish air preheater coils to maintain the proper cold end air-in, gas-out average temperature for air heater protection during low ambient air temperature conditions. The maximum pressure drop of the air across the coils will be 3.0 inches wg. 547
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CO #11
R-1 Item
B(d)

"The air preheat coils will be located in the fan room wall and supported by the fan room steel."

Each air heater shall be equipped with: 551

(a) Complete driving mechanism including speed reducer and electric motor. 553

(b) Auxiliary air motor drive. 555

(c) Observation port at hot gas inlet. 557

(d) Glass porthole and observation light at cold air inlet. 559

(e) Cleaning devices consisting of a water washing system and hot and cold side soothblowing systems. 561

CO #
11 R-1
Item 3(d)

"(f) A complete fire detection and suppression system as specified in Subarticle 11.1 of this division. Separate systems shall be provided for each air heater."

(g) Permanent ladders or platforms inside all access openings which are more than 3 feet above the internal structure. 565
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(h) Rotor stoppage alarm contacts to provide indication in the control room of a rotor stoppage. 568

(i) Redundant pressure taps to monitor the pressure drop across each air heater. Pressure taps shall be one-inch NPT, extending 3 inches beyond the insulation and shall be capped. 570
571

(j) Four access doors, one each at the air inlet and outlet ducts and flue gas inlet and outlet ducts. 573

A complete system for lubricating and cooling the bearings shall be provided as required by the air heater design. The system shall include thermometers, pressure gauges, temperature and pressure switches for alarm and control, piping, and other accessories. Separate systems shall be provided for each air heater. 575
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The heat exchanger shall have 90-10 copper-nickel tubes and bronze tube sheets. The heat exchanger shall be sized for 105F cooling water at 150 psi. The oil reservoir tank shall be coated internally with Rusttan. The reservoir shall be complete with dual 480-volt, 3-phase, 60-hertz, electric heaters and an oil level sight gage. The heaters shall be complete with combination thermostat and contactor controls. The heater shall automatically maintain the temperature of the oil in the reservoir at the selected temperature when the air heater is idle.

- 11.1 Fire Detection and Suppression System: Each air heater shall be furnished with a complete fire detection and suppression system designed to meet all requirements as specified herein. All materials and equipment shall be in accordance with the latest applicable requirements of FM, NFPA, and UL.

The fire suppression system shall be of the water spray type with infrared detectors, detector cleaning ports, glass observation ports, and hose stream access ports.

The water spray nozzles shall be located in the gas inlet duct and air outlet duct of each air heater. The water spray application shall provide simultaneous total coverage of the heat transfer matrix. The spray system shall not depend on rotation of the heat transfer matrix to achieve total coverage. The water spray discharge density shall be no less than 0.6 gallons per minute per square foot plan area of the air heater heat transfer matrix.

The infrared detectors shall be located in the air inlet duct of each air heater. Each infrared detector shall have a rotatable sensing head mounted on an arm with the detector looking into the baskets parallel to the axis of the rotor shaft. Cleaning ports shall be provided for the detectors.

Access hatches for use of hose streams and glass observation ports shall be provided above the rotor approximately 3 to 5 feet above floor level. Two access hatches and one glass observation port shall be provided on the hot gas inlet, and two access hatches and one glass observation port shall be provided on the hot air outlet.

12. Penthouse: The steam drums, except for the drum ends, and all headers, tubes, and piping above the furnace and convection pass roof shall be enclosed in a penthouse. The penthouse shall be constructed of steel plate suitably reinforced to adequately support construction and maintenance loads.

Pipe sleeves for introduction of maintenance scaffold 596
 rigging cables into the interior of the boiler shall be provided 597
 through the penthouse. The pipe sleeves shall be seal welded at 598
 the furnace roof and shall be capped above the penthouse roof.
 The sleeves shall be not less than 1-1/2-inch pipe. The sleeves 600
 shall be of sufficient number to permit access from suspended 601
 scaffolds to all interior surfaces including the furnace,
 superheater and reheater areas, each side of platen surfaces, 602
 and the rear pass above the economizer.

Ample heat release openings and air inlets in the 604
 penthouse enclosure walls and roof for accelerated cooling shall 605
 be provided to permit access to the penthouse immediately
 following outage of the unit. 606

DELETED
 ORIGINAL 4
 C.O.#2
 CHANGE TO
 READ AS
 SHOWN IN
 C.O.#3
 ITEM 4(d)

"13. Air and Flue Gas Ducts: Air and flue
 gastight ducts shall be provided for conducting
 the air from the forced draft fans to the air
 heaters, for conducting the air from the air
 heaters to the burner wind box, for conducting
 the flue gas from the boiler to the air heaters,
~~conducting the flue gas from the air heaters~~
~~to the fabric filters~~, and as necessary for
 conducting primary air. ~~The dimensions for the~~
~~flue gas ductwork from the air heaters to the~~
~~fabric filter will be established by the IPA.~~
~~All other ducts shall be sized by the contractor.~~
 Duct velocities shall be limited to 3,000 feet
 per minute at maximum capacity and 30 per cent
 excess air."

C.O.#3
 ITEM 6

"The air heater flue and duct arrangement shall be
 as shown on the Contractor's Drawing P23-310-48Y0."

C.O.#2
 ITEM 14

"Provisions shall be made for the isolation of
 each air heater while maintaining the boiler
 in service to not less than 60 per cent of
 maximum capacity. Such provisions shall
 include necessary air ducts and burner wind
 box to ensure equal airflow to all burners.
 Such provisions shall also include automatically
 operated louver shut-off dampers at the primary

and secondary air heater combustion air inlets,
 combustion air outlets, and flue gas inlets.
 The primary air heater flue gas inlet dampers
 shall be provided with modulating control
 drives to regulate the gas flow to the primary
 air heaters."

C.O.#3
 ITEM 4(e)

"All air and flue gas ducts, except the flue
 gas duct from the air heaters to the fabric
 filters, shall be as specified below. The
 flue gas duct from the air heaters to the
 fabric filters shall be as specified in
 Subarticle 13.1 of this division.

G 3 - 23 (a)

802 #3
Item 4(e)

All flue gas ducts upstream of the air heaters and air ducts shall be constructed of ASTM A285, Grade C, as last revised, steel plate not less than 1/4 inch thick, except for minor ducts used for cooling air which may be as thin as 12 gage.

The interior of all air ducts, all flue gas ducts upstream of the air heaters, and all burner wind boxes shall be painted with a white protective coating before shipment to the plant site."

A venturi type or air foil primary element device shall be furnished to measure the flow of combustion air in each hot air duct between the air heaters and the windbox. Pitot tubes shall be used in each primary air duct between the air heaters and the pulverizers. 625 627

Expansion joints shall be furnished where necessary to relieve expansion stresses and shall be made of Corten steel not less than 16 gage. Expansion joints shall be designed to preclude restricted movement by accumulation of fly ash or dust. 629 630 631

Provisions shall be made for draining washings from the ducts. Where practicable, the expansion joints shall be installed in vertical sections of ducts. 633 634

Hoppers shall be located directly below the economizer and designed so that washings from the economizer will not enter the ducts to the air heaters. 636 637

The windbox and equipment attached thereto shall be supported by the water wall tubes independently of the boiler steel. Secondary air ducts attached to the windbox shall be supported by steel furnished by the IPA. Adequate seals and metal expansion joints shall be provided between the air ducts and the windbox. One access door shall be furnished for each row of burners for access into the windbox, and the following additional access and observation doors shall be furnished as follows: 639 640 641 642 643 644

(a) One 37-inch by 56-inch access door in each convection pass side wall above the top bank of reheater horizontal surface. 646 647

(b) Two 15-inch by 21-inch access doors in each convection pass side wall for access to the gas distribution dampers. 649 650

(c) One 15-inch by 21-inch access door in each furnace side wall approximately 15 feet above the centerline of the hopper throat. 652 653

DIVISION G3

Spec. 2010N
Revised May 29, 1981
DETAILED REQUIREMENTS FOR ITEM 1

(d) Six 37-inch by 56-inch access doors in the 655
penthouse. Two doors shall be on the roof and 2 doors shall be 656
on each side.

(e) Two observation doors in the furnace front 658
wall at approximately the elevation of the bottom of the 659
superheater platens.

(f) One observation door in each side wall in 661
front of the superheater platens.

These doors shall be designed to be opened without the 663
use of special tools.

Drain connections shall be furnished so that all parts 665
of the windbox can be completely drained after washing.

The windbox inner skin shall be of all welded steel 667
plate construction. The windbox shall be capable of supporting 668
minor loads from IPA furnished equipment.

The burner front shall be designed so that the heat 670
transferred from the combustion air to the burner front by 671
conduction through metal is kept to a minimum. The burner front 672
shall be insulated in the same manner as the windbox.

SEE 13.1 ON PAGE G3 25(a-f)

"13.1 Air Heater Outlet to Fabric Filter Inlet Ductwork: The Contractor shall furnish all ductwork from the air heater outlets to the fabric filter inlets. Expansion joints,

C.C.#11
R-1 Item
4(a)

"Expansion joints, supports and hangers, gas distribution device, access hatches, instrument connections, test ports, test probe supports, insulation, and lagging shall be furnished as required.

The ductwork shall be in accordance with the following requirements. Requirements not specified herein shall be in accordance with Article 13 of Division G3.

13.1.1 Arrangement: The arrangement of the ductwork shall be as indicated on Black & Veatch Drawings 9255-SM-0138A Revision 1, and 9255-SM-0138B Revision 0, Air Heater Outlet Ductwork. The ductwork shall include hoppers directly below the air heater outlets for collection of particulate matter and air heater wash water. The hoppers shall be constructed of the same material as the adjoining ductwork. The hoppers shall be flanged to mate with an Owner-furnished fly ash removal system, as well as Owner-furnished provisions for removal of air heater wash water. The Contractor shall provide a flanged hopper outlet connection whose size and drilling pattern will be determined by the Engineer. The hoppers shall be capable of supporting Owner-furnished removal system components. Lugs shall be provided on the hoppers for support of the components as required.

C.C.#3
Item 4
(f)

The ductwork shall be supported from the Owner's structural steel. All steel, hangers, and support bearings required to support the ductwork from the major members of the Owner's steel shall be furnished by the Contractor. Additional duct support steel north of Column Row R will be furnished by the Owner and coordinated with the design of the subject ductwork.

13.1.2 Schedule: The Contractor shall schedule delivery and erection of equipment and materials in accordance with the following listed dates. Each activity shall be completed not later than the date specified. Delivery

G3-25(a)

IPP



INTERMOUNTAIN POWER PROJECT
A DEVELOPMENT OF INTERMOUNTAIN POWER AGENCY

CHANGE ORDER

CONTRACTOR Babcock & Wilcox
4370 West 109th Street
Overland Park, Kansas 66211

CONTRACT FOR Steam Generator

OWNER INTERMOUNTAIN POWER AGENCY

PROJECT INTERMOUNTAIN POWER PROJECT

REVISED February 3,
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CHANGE ORDER NO. 003

DATE November 13,

SPECIFICATION NO. 201

FILE NO. 62.3401.01

PROJECT NO. 9255

of equipment or material significantly earlier than required to meet the scheduled erection dates may be made only with the Project Manager's permission.

<u>Activity</u>	<u>Unit 1</u>	<u>Unit 2</u>	<u>Unit 3</u>	<u>Unit 4</u>
Start Erection	06-01-84	06-01-85	06-01-86	06-01-87
Complete Erection	12-01-84	12-01-85	12-01-86	12-01-87

The Contractor shall submit the following engineering drawings and data for review in accordance with the following schedule. The Contractor shall submit all other engineering data and documentation as required by Article 6 of Division F1.

<u>Certified Drawings of Review</u>	<u>Number of Copies Submitted</u>	<u>Time of Submittal</u>
Loading diagrams	6 copies plus 1 sepia-- Engineer	January 6, 1982
Detailed ductwork drawings indicating ductwork, duct hoppers, expansion joints, supports, access hatches, instrument connections, etc.		February 6, 1982

C.O. # 3
Item 4 (f)

G3-25(2)



CHANGE ORDER

CONTRACTOR Babcock & Wilcox
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CONTRACT FOR Steam Generator
OWNER INTERMOUNTAIN POWER AGENCY
PROJECT INTERMOUNTAIN POWER PROJECT

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PROJECT NO. 9255

<u>Certified Drawings of Review</u>	<u>Number of Copies Submitted</u>	<u>Time of Submittal</u>
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Detailed assembly drawings of expansion joints, access hatches, etc.		April 6, 1982
---	--	---------------

Insulation and lagging drawings		April 6, 1982
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13.1.3 Design Criteria: The ductwork and
expansion joints shall be designed for the
following.

- (1) Design temperature shall be 305 F for
continuous operation, and 750 F for
maximum transient considerations. The
maximum transient temperature excursion
shall be assumed to have a duration of
30 minutes and shall not be assumed to be
concurrent with a seismic event.
- (2) Minimum design pressure at allowable
design stress shall be plus or minus
15 inches H₂O at 750 F.
- (3) Minimum design pressure at yield stress
shall be plus 25 inches H₂O at 305 F and
minus 47 inches H₂O at 305 F.
- (4) Minimum design wind load as required by
ANSI A58.1-72 with basic wind speed of
84 mph, Exposure Condition Class C, Open
Country.
- (5) Minimum design snow load of 20 psf modified
per ANSI A58.1 for parapets, slopes, and
obstructions.

C.O. #3
ITEM 4 (A)

G3-25(c)



CHANGE ORDER

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- (6) Minimum design rainfall of 1.1 inches in 1 hour.
- (7) Seismic requirements as specified in Article 10 of Division F1.
- (8) Flue gas characteristics which result from operating with coal from any of the coal reserves listed in Article 3 of Division G3.
- (9) Internal loading bulk density of 120 lb/ft³. The hoppers shall be designed for full volume internal loading. The horizontal and inclined ductwork shall be designed for internal loading based on fly ash 3 feet above the bottom for gravity load and 17 inches above the bottom for gravity load and seismic load in combination.
- (10) Maximum allowable stresses in the materials shall be in accordance with Section 1.5.1 of the AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" (effective November 1, 1978) and its commentary. The value of F_y for material for the design of the ductwork and internal bracing and trusses shall be the 0.2 per cent offset yield strength at the design temperature.
- 13.1.4 Materials: The materials of construction shall be new and undamaged, and shall conform to pertinent AISC and ASTM standard specifications and the following requirements.
- (1) Ductwork shapes and plates exposed to flue gas shall be ASTM A588.

C.O. #3
Item 4 (A)

G3-25 (d)

1815



CHANGE ORDER

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CONTRACT FOR Steam Generator
OWNER INTERMOUNTAIN POWER AGENCY
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- (2) External stiffeners (not exposed to flue gas) shall be ASTM A36.
- (3) Ductwork internal bracing shall be ASTM A335, Grade P11, Schedule 80, minimum.
- (4) Shop and field bolts for structural connections shall be ASTM A325, Type 1, bolts, nuts, washers, and load indicating washers. A minimum size of 1 inch shall be provided.
- (5) Expansion joint bolts shall be Weathering steel, Bethlehem "Mayari R Bolts," heavy hexagonal with nuts and washers, 1/2 inch diameter.
- (6) All ductwork and gas distribution devices shall be constructed of steel plates not less than 1/4 inch thick.

13.1.5 Expansion Joints: Expansion joints shall be provided as required. Expansion joints shall be constructed of a single sheet not less than 1/4 inch thick consisting of fluoroelastomer and two plies of 35 ounce per square yard plain woven fiberglass cloth. The fluoroelastomer shall conform to ASTM D2000 2HK 715 Z1 containing not less than 70 per cent DuPont Viton B Polymer. Reclaimed elastomers shall not be used.

13.1.6 Insulation: The Contractor shall furnish insulation for all ductwork and hoppers. Insulation thickness shall be as required to prevent cold spots and condensation on interior surfaces. In no cases shall the thickness be less than 4 inches. The Owner will furnish metal wall panel on all exterior locations

C.O. #3
Item 4(f)

G3-25(e)



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(north of Column Row R). The Contractor shall provide lagging and flashing on interior ductwork (south of Column Row R). The lagging and flashing shall be provided as specified in Article 17 of Division G3.

13.1.7 Erection: The Contractor shall erect all ductwork, supports and hangers, expansion joints, insulation, and lagging including the Owner-furnished wall panel for ductwork north of Column Row R.

The Contractor shall interface with adjacent equipment at the following connections.

Air heater outlet flanged connections
(4).

Fabric filter inlet flanged connections
(3).

Air heater outlet hopper flanged fly ash
system connections (4).

Air heater outlet hopper flanged wash
water drain connections (4).

Instrument and other miscellaneous connec-
tions (as required):

The Contractor shall furnish and install the required bolting and accessories to connect the air heater outlet ductwork to the air heater outlets and fabric filter inlets. The Owner will provide the required bolting and accessories to connect the ash handling equipment to the air heater outlet hopper discharge flanges."

G3-25(f)

14. Setting: The Contractor shall furnish a tube 675
supported setting consisting of a gastight enclosure,
insulation, and aluminum cover. 676

The setting shall be suitable for indoor service. 678
Gutters shall be provided for drainage of rainwater from all 679
exposed horizontal surfaces. Drain connections shall be 680
provided for all areas in which water can collect. The IPA will 681
furnish and install downspouts from the gutters and other drain
connections.

All the adjoining parts of the boiler setting which 682
may have relative or differential movement shall be provided 684
with proper and adequate seals designed to allow for such
movement. The insulation and covering over header handholes 685
shall be readily removable and replaceable.

15. Enclosure: Steel sheets used for sealing the 688
enclosure shall be not less than 10 gage.

Where welded wall design is used, the welded wall 690
shall consist of tubes continuously joined along their
contiguous centerline so that no additional seal is necessary to 691

make the setting gastight. Provisions shall be made to prevent 692
the flow of air between the welded wall and the insulation. 692

16. Boiler Unit Insulation: The Contractor shall 695
furnish and install all materials necessary to insulate all 696
surfaces of the Boiler Unit which would otherwise operate above 697
130F. While the steam generator is operating, the surface 697
temperature of all outside covering of insulation to be 698
furnished shall not exceed 130F when the ambient air temperature 698
is 80F, with an outside surface air velocity of not greater than
50 fpm.

The boiler enclosure surfaces shall be insulated with 700
a commercially available mineral wool insulation which meets the 701
requirements of ASTM C 612, Class 3. A single layer of 702
insulation shall be used up to thicknesses of 4 1/2 inches.
Eighty-five percent magnesia insulation or insulation containing 703
asbestos shall not be used. ~~Where the total insulation~~ 4/16/83 704
~~thickness required is greater than 2 inches, the enclosure shall~~ ~~be insulated with 2 layers.~~ ~~The layers shall fit snugly against~~ 8-11-82 705
each other and shall have staggered joints butted tightly
together. The block insulation shall be held in place with 706
corrosion resistant studs or tie wires securely fastened to the 707
steel casing. No adhesive shall be used to attach the 708
insulation to the steel casing or to hold the blocks together.

Headers, piping, and tubing in the penthouse operating 710
at temperatures above 875F shall be insulated.

"17. Boiler Unit Cover. Ribbed aluminum alloy
sheeting of Aluminum Association Alloy 3004-H34
Alclad shall be used to cover all insulated surfaces
of the complete boiler unit except the roof, wind
box, air heater, air and flue gas ducts, and piping.
The boiler roof shall be covered with 10-gage
steel. The air heaters, air and flue gas ducts,
and wind box shall be covered with either ribbed or
flat aluminum alloy sheeting of Aluminum Association
Alloy 3004-H34 Alclad or 3051-H36. All aluminum
shall have a minimum thickness of 0.060 inch and
shall be embossed."

C.O.#2
ITEM 12

Adequate provisions shall be made for expansion, such 722
as the use of expansion joints or breaks and cross breaks. The 724
sheets shall have a minimum overlap of 2 inches. The design of 725
the covering shall provide for protection against corrosion
including the prevention of contact between dissimilar metals. 726
There shall be no seams or joints in which water can collect. 727

The ribbed aluminum shall be mounted on the buckstays 729
with the inner surface flush with the insulation. Thermal air 730
flow barriers are to be provided between the wall tubes and the
covering to prevent the rise of warm air in the walls caused by 731
the natural stack effect. These barriers shall be located at a 732
maximum of 10-foot intervals. Joints between the covering and 733
opening in the settings, such as doors, wall boxes, and
instrument connections shall have a refractory fill used around 734
the bent tubes to create a seal. The seal shall be weathertight 735
in such a way that caulking of joints is not necessary to
prevent the entrance of moisture. Insulation shall cover the 736
refractory box. Flashing shall be used to close these areas 737
into the covering.

The entire roof shall be covered with a double layer 739
of calcium silicate block insulation. This insulation shall be 740
impaled on the gage pins which are welded to the inner roof
casing, the casing forming the pressure seal coverings in 741
locations which will be convenient.

The roof and all covering in locations which will be 743
convenient for working platforms or likely to be stepped on 744
shall be designed to support a uniform live load of 20 pounds
per square foot minimum and a concentrated live load of 300 745
pounds in the center of any span without causing deterioration 746
of insulation.

18. Insulation for Headers, Piping, Fittings, and 748
Valves: The Contractor shall furnish insulation and covering 749
for all headers, piping, tubing, fittings, and valves furnished
by him except as provided elsewhere herein. 750

The insulation material shall be calcium silicate 752
block which meets the requirements of ASTM C 533. Insulation 753
containing asbestos shall not be used. Insulation shall be 754
furnished in sectional or segmental form for piping and bends
and shall snugly fit standard steel or wrought iron pipe or 755
tubing. When applied in 2 layers, the contiguous layers shall 756
fit snugly against each other, and different layer joints shall
be staggered. All connections passing through the setting shall 758
be suitably sealed with provisions for thermal expansion to 759
maintain the casing gastight.

Bundled supply tubes may be insulated with a blanket 761
mineral fiber insulation meeting the requirements of ASTM C 592, 762
Class II.

Insulating cement, glass cloth, and adhesive shall be 764
of material which is compatible with other insulating materials 765
specified and suitable for the design conditions.

(a) Straight Pipe: The sectional or segmental 768
insulation shall have each layer tightly fitted and held in 769
place by means of straps or wires prior to application of the 770
aluminum jacket. Straps or wires shall be sufficiently embedded 771
in the insulation material to prevent contact with the outer 772
jacket. No adhesive shall be used to attach insulation to 773
piping or to hold sections or segments together. Straps or 774
bands for securing insulation shall be 3/4-inch by 0.020-inch
stainless steel. Wire shall be 16 gage, Type 302, dead-soft 774
stainless steel.

The insulation on vertical runs of piping shall be 776
supported at the lower end of each run and from there on upwards 777
approximately every 9 feet by suitable clamp type supports
supplied by the Contractor. These supports, where they contact 778
the piping, shall be the same material as the piping or of a
similar alloy which has approximately the same expansion and 779
contraction characteristics as the piping. No welding of any 780
nature shall be used to these lines for the purpose of
supporting insulation.

The insulation shall be covered with 0.010-inch 782
steel lagging or, if aluminum, 0.016-inch lagging, both having a 783
vapor barrier on the interior surface.

Jackets shall be held in place with stainless steel 785
straps, pulled tightly around the jackets, and secured by 786
suitable aluminum or stainless steel clips or seals. In 787
addition, S-clips shall be used at the circumferential joints on
vertical piping. The aluminum jacket shall be applied over dry 788
insulation.

Weather resistant covering shall be provided where 790
clamps, hangers, anchors, supports, or other items project 791
through the insulation and jacketing.

(b) Pipe Bends: All pipe bends shall be insulated 794
with the same materials and to the same thickness as the 795
adjoining runs of straight piping. Insulation shall be cut into 796
short mitered lengths and applied in broken joint construction
so as to butt tightly together and completely cover the bend. 797
Tie wires to hold the various lengths in place may be applied. 798
A coating of insulating cement shall be applied and finished to 799
a smooth, uniform contour of the bend.

A final coating of finishing cement shall be applied and finished to a smooth, uniform contour of the bend.	801
After drying, an aluminum jacket shall be applied.	802
Aluminum jackets shall overlap at all joints in such a manner as to be weathertight and shall be held in place by means of straps or metal screws.	804 805
(C) <u>Pipe Fittings and Valves:</u> The insulation on all fittings and valves, 4-inch pipe size and larger, shall be the same thickness and material as the adjacent piping insulation with either pipe or block insulation secured in place. All joints shall be pointed or filled with insulating cement and the entire insulation covered with a coat of finishing cement troweled to a smooth surface and contour and then covered.	808 809 810 811
Valves and fittings, 3-1/2 inches and smaller, shall be insulated with insulating cement having a total thickness equal to that of the adjacent piping insulation. Two or more layers of this cement, 1/2 inch thick, shall be applied with each layer being completely dried before proceeding with the next layer. After the final layer of insulating cement has thoroughly dried, the insulation shall be given a coat of finishing cement and then covered.	813 814 815 816 817 818
Elbow insulation with an outside diameter of 3 through 12-1/2 inches shall be covered with a General Aluminum Supply Company Gasco humped elbow. This jacket may be secured in place by means of straps or metal screws. All other fittings and valves shall be covered with glass cloth.	820 821 822 823
The bodies and bonnets of valves shall be insulated.	825
19. <u>Steam Sootblower System:</u>	827
19.1 <u>General:</u> A steam sootblower system shall be furnished. Equipment shall be of the Copes Vulcan or Diamond Power design. Sootblowers shall be located for efficient cleaning of the boiler surfaces including air heaters. The sootblowers when operated through a blowing cycle not more than once each shift shall maintain boiler surface cleanliness such that guaranteed performance is obtained continuously. The sootblowing system shall be designed to provide a minimum cleaning time consistent with good practice. The sootblower system shall be designed with capability for simultaneous blowing of the 2 highest usage retractables, 2 wall blowers, and 2 air heater cleaners. If the sootblower system proves to be	830 831 832 833 834 836 837 838 839

inadequate during the guarantee period, the Contractor shall furnish and install the additional equipment necessary to maintain guaranteed performance. 840

The sootblower system shall include all piping and equipment necessary to supply boiler produced steam for sootblowing. 842
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The steam supply for the boiler sootblowers, excluding the air heater sootblowers, shall be from the superheater at a location such that the reduced pressure steam or conditioned steam will contain not less than 50F superheat. Two separate sources on the superheater shall be provided such that the steam supply piping on each side of the boiler will be designed as an independent piping system. Each source shall be provided with a pressure regulating valve and manual isolating valves such that the regulating valve can be removed from service during operation of the boiler. The 2 steam supply piping systems shall be connected by a valved crossover connection located downstream of the pressure regulating valve and shall be capable of meeting the steam capacity requirements specified above with one pressure regulating valve out of service. 845
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The steam supply for the air heater sootblowers shall be from the superheater at a location such that the reduced pressure steam or conditioned steam will contain not less than 250F superheat. A single source for air heater sootblowing steam shall be provided. A pressure regulating valve shall be provided with manual isolating valves. 856
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All piping, insulations, valves, control valves, safety valves, drain valves, pressure switches, orifices, steam traps, and other accessories required for a complete operating sootblower system shall be furnished including all piping from the steam supply to the sootblowers and all drain piping. A manually-operated isolation valve shall be provided in the steam supply piping to each sootblower. A motor-operated block valve shall be provided upstream of the pressure reducing valves. A motor-operated isolation valve, interlocked to close when no sootblowers are in service, shall be provided in the sootblowing system drain line. 861
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The piping shall be sloped and routed to assure drainage of condensate and to assure correct steam temperature to each blower. The piping shall be routed in a downward arrangement such that sootblowers are supplied from looped headers encircling the boiler to minimize pressure drop. Each vertical header shall terminate with an automatic condensate trap. 869
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A thermal drain valve and temperature controller shall 875
be furnished at the low points of all supply piping to assure 876
complete drainage of condensate. The thermal drain valve shall 877
be sized to assure drainage of any condensate while the
sootblower system is not in service and to maintain the correct 878
blower-steam temperature when the system is in service. Each 879
thermal drain valve shall be provided with upstream and
downstream isolation valves and valved bypasses." ADDED PER C.O. #11 R-1
ITEM 6

All control valve stations shall be firmly anchored. 881

The sootblowers shall be electric rotor-driven, 883
electrically controlled, and enclosed in a housing designed to 884
protect the lances and moving parts from the environment.

All sootblowers in gas temperatures above 1900F and 886
sootblowers with a travel exceeding 35 feet in gas temperatures 887
above 1100F shall be provided with either pressure or flow
measuring devices on the main headers or individual pressure 888
switches.

Provisions shall be included to manually retract 890
equipment in the event of power loss. Manual retraction shall 891
be by hand crank or hand held power-driven source.

Each sootblower lance shall be capable of being 893
removed while the unit is in operation. The boiler shall be 894
provided with 6 sootblower wallbox blanking fixtures.

Each sootblower shall have an admissions valve. This 897
valve shall not open until the lance clears the wall tubes and
shall close before the lance retracts to the face of the wall 898
tube. Steam blowing admission valves shall have valve seat and 899
seat rim of stellite or stainless steel.

A local push-button station shall be furnished for 901
each retractable sootblower. The local control push button at 902
each sootblower shall be mounted on the sootblower electrical
connection box, except when the sootblower is located more than 903
6 feet above an access platform. Each sootblower shall be wired 904
to disconnect type terminal blocks so that either the power or
control supply can disconnect individually. The terminal blocks 906
shall be States Company Type ZWM. The valves and fittings 907
necessary to furnish scavenging air to each sootblower lance
shall be furnished. 908

19.2 Retractable Sootblowers: Long retractable 911
sootblowers shall be designed to eliminate the possibility of a
lance tube being propelled into the boiler setting by thrust of 912

the blowing medium in the event of a power failure or malfunction of a drive motor. The lance tube-carriage design shall provide for minimum lance deflection at full extension. The lance tube nozzle shall have a helical pattern for optimum cleaning. Sootblowers shall be capable of variable travel speeds up to a maximum of 200 inches per minute while maintaining an effective cleaning pattern. A front support assembly shall be furnished to ensure proper lance tube alignment in the wallbox. Rollers on the front mounting bracket shall allow true rolling contact to minimize wear on both the rollers and lances. Provisions shall be made for scheduled lubrication.

19.3 Wall Blowers: The furnace wall blower operation shall be such that the blowing medium supply valve will open when the nozzle is in the correct position for blowing. Provision shall be made for field adjustment of wall blower nozzles both longitudinally and radially. The wall blowers located in corners shall be made for blowing arcs of less than 360 degrees.

19.4 Air Preheater:

"The air preheater soot blowers shall be capable of cleaning the full surface of the air heater baskets and shall be retractable soot blowers as manufactured by Diamond Power."

19.5 Control System: The control system shall be microprocessor based and shall be designed to provide individual or automatic sequential operation of the sootblower units. The control system shall consist of 3 sections: (1) a power control cabinet located remote from the control room, (2) an operator's panel located in the control room, and (3) a free-standing logic cabinet located remote from the control room. The power control cabinet shall include an individual reversing starter for each sootblower, overcurrent protective devices, and motor-current transducers for the blower motors and a 480/120-volt control power transformer to supply the control circuits. An overload and stall overcurrent device shall be furnished to monitor each motor. Each power control cabinet shall be equipped with a circuit breaker to allow isolation for maintenance. The power control cabinet shall have a total of 5 spare starters and sufficient space for all future sootblowers.

The operator's panel shall include a boiler/mimic diagram having individual unit indicating lights representing the sootblower locations, operator controls, and the system status and alarm indicators. The sootblower control system shall be arranged with not less than 3 subsystems; i.e., furnace wall, long retractable, and air heater sootblowers. These components shall be logically grouped by function or subsystem,

or both, so as to provide maximum ease of operation. The master 948
program shall be preprogrammed by the manufacturer and contain
all of the permissives, interlocks, and standard sequential 949
routine for the particular boiler. The master program shall be 950
stored in a nonvolatile memory. The sootblower control system 951
shall be capable of storing 9 separate blowing sequences for
each subsystem. The Contractor shall program at least one of 952
these subsystem sequences. The various sequences for each 953
sootblower subsystem, whether preprogrammed or user generated,
shall be switch selectable by the operator. The control system 955
shall have the ability to be programmed at the plant site
without removal from the control panel. Provisions shall also 956
be made for verifying the blowing sequences and the sootblowers
out of service. Means shall be provided to permit the operator 957
to test all computer controlled indicator lights. The control 958
system shall incorporate self-testing to the maximum extent.

The control system shall have the capability of 960
monitoring the operating performance of each sootblower. A 961
printer shall be furnished that will record sootblower operation
during the shift.

The operator's control panel shall be equipped with, 963
but not limited to, the following:

(a) Boiler diagram with individual unit lights 965
representing the sootblower locations.

(b) Master stop-start push button. 967

(c) Sequence stop push button. 969

(d) Retract push button for long retractable 971
blowers.

(e) Lights with colored lens to indicate the 973
following:

- PER C.O. #3
ITEM 10*
- (1) Power on - white. RED 975
 - (2) Loss of blowing steam pressure or flow - red. ^{white} 978
 - (3) Sequence complete - white. GREEN 981
 - (4) Sequence in hold - amber. RED 983
 - (5) Forward travel of a long retractable 985
sootblower - red.

(6) Reverse travel of a long retractable soot blower--green.	987
(7) Motor overload--white.	989
(8) Elapsed time alarm for retractables--white.	991
(9) Control voltage failure--white."	993
(f) Means to indicate which sootblowers are operating.	995
(g) Means to indicate which sootblowers have completed operation.	997
(h) Means to indicate which sootblowers are operating when alarm occurs.	999
Switches and lights shall be furnished and wired for all planned future sootblowers as recommended by the boiler manufacturer.	1001 1002
The control system shall automatically retract any long retractable blower in operation, suspend blowing the affected subsystem sequence, and actuate the IPA annunciator system when:	1004 1005
(a) A boiler trip condition has occurred.	1007
(b) Electric power is restored after a failure.	1009
(c) Steam supply pressure or flow is low.	1011
(d) A long retractable motor has overloaded.	1013
(e) A long retractable motor has stalled.	1015
(f) A sootblower fails to start when initiated by the panel.	1017
(g) Sootblower operating time exceeds normal operating time.	1019
(h) Lance tube blowing medium pressure or flow is low on the long retractable sootblowers.	1021
Means shall be provided to manually reset the control system after an alarm condition has been corrected.	1023

The operator's control panel shall be furnished	1025
completely shop wired with connection to the remote logic panel	1026
by means of plug-connected, prefabricated cables.	
Interconnecting cable length shall be not less than 100 feet.	1027
The remote logic cabinet and power control cabinets shall be	1028
wired to States Company Type ZWM terminal blocks for field	
connections. Terminals shall be provided in the power control	1029
cabinet for termination of manual push-button stations, wiring	1030
to be furnished by the IPA for each sootblower. The control	1031
system shall be equipped with electrically isolated contacts	
rated for operation at 125 volts dc for the annunciator system.	1032
 <u>19.6 Mechanical Equipment:</u>	1034
 <u>19.6.1 Motor-Rack and Pinion Drive:</u> If a motor-rack	1037
and pinion drive is furnished, ratings of the motor-rack and	
pinion drive shall be based on intermittent service, with a	1038
service factor of one, based on the normal load torque required	1039
at the rack and pinion drive low-speed shaft. The rack and	1040
pinion drive shall be designed to withstand momentary peak	
loads, up to the maximum torque developed by the motor selected,	1041
without exceeding 75 percent of the yield stress at any point in	1042
the rack and pinion drive. The motor rack and pinion drive	1043
shall be designed for outdoor use and be corrosion-resistant.	
 <u>19.6.2 Lance Tube:</u> The lance tube shall be	1046
fabricated of an alloy steel that will withstand flue gas design	
temperatures without loss of structural properties.	1047
 <u>19.6.3 Motor-Chain Drive:</u> If a motor-chain drive is	1050
furnished instead of a motor-rack and pinion drive, the chain	
drive shall be prelubricated and self-cleaning. The chain drive	1052
shall be enclosed, shall be designed for outdoor use, and shall	
be corrosion-resistant. An external tension adjustment shall be	1053
provided for the chain.	
 <u>19.6.4 Wall Boxes:</u> Wall boxes through which the	1056
sootblowers will extend through the boiler walls shall be	
furnished for mounting on the boiler walls.	1057
 <u>19.7 Future Sootblower Locations:</u> The Contractor	1060
shall consider Boiler Unit operation changes and coal quality	
changes when determining locations for possible future	1061
installation of sootblowers. Locations designated by the	1062
Contractor for possible future installation of sootblowers shall	
be kept clear so as to not hinder installation of future	1063
sootblowers nor limit the cleaning effectiveness of the future	1064
sootblowers. Bent tube openings for future sootblowers shall be	1065
provided with tight closures which prevent ash accumulation.	

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19.8 Sootblower Equipment and Material Furnished 1067
by IPA: The IPA will furnish sootblower equipment and material 1068
as follows:

(a) All wiring connecting the sootblowers, the 1070
control panel, and the contactor cabinets except for the cable 1071
and connectors between the control panel and the logic cabinet.

(b) A separate 120-volt, 60-hertz, single-phase 1073
a-c supply circuit to the control panel indicating lights and 1074
alarm relays.

"19.9 Scrubber Flue Gas Reheater Soot Blower
Steam Supply: In addition to the steam supplies
for the boiler and air heater soot blowers,
the Contractor shall provide a separate steam
outlet connection for supplying steam to the
scrubber reheater soot blowers furnished under
separate specifications.

A single source for scrubber reheater soot
blowing steam shall be provided from the
secondary platen superheater headers. The
steam supply shall be capable of supplying
40,000 pounds per hour of steam during variable
pressure operation at 25 per cent load. The
connection shall be provided with one manual
shut-off valve and one motor-operated shut-off
valve. The motor-operated valve shall be
located downstream of the manual shut-off
valve.

The scrubber reheater soot blowing steam
pressure regulating station will be furnished
by the IPA."

20. Fuel Burning and Handling Equipment: 1076

20.1 General: Burner equipment capable of burning 1079
each of the specified coals shall be furnished.

The Boiler Unit shall be capable of operating at any 1081
load from 20 percent of Maximum Capacity to Maximum Continuous 1082
Rating without continuous use of supplemental fuels.

The Boiler Unit shall be capable of the following: 1084

(a) Operation at 20 percent of Maximum Capacity 1086
with 2 pulverizers in service.

(b) Operation at Maximum Capacity when operating 1089
with one pulverizer out of service, with the remaining 1089
pulverizers in a worn condition, and with coal having the 1090
following characteristics:

(1) A higher heating value of 10,700 Btu, a 1092
Hardgrove Grindability Index of 40 or less

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*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

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(2) A higher heating value of 9,500 Btu, a 1095
Hardgrove Grindability Index of 55, and a moisture content of 22 1096
percent.

A pulverizer shall be considered in worn condition 1098
when its coal output can be increased by 11 percent by 1099
replacement of worn grinding surfaces.

All required ignitor air, sealing air, and cooling air 1101
shall be provided.

20.2 Burner Operation: The burners shall be capable 1104
of remote operation from the control room including (1) lighting 1105
off, (2) safety interlocks providing safe burner operation 1106

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during all phases of firing, (3) taking burners out of service, (4) shutting down, and (5) purging the boiler. 1107

20.3 Coal Burners: Each coal burner and associated equipment shall be capable of stable operation continuously from 45 percent to 115 percent of the Btu output of the burner at Maximum Capacity without supplemental fuels. 1110
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20.4 Electrical Connections: All electrical connections between components shall be made with waterproof connectors which connect directly to their respective devices without adapters. The connectors shall be furnished complete with waterproof receptacle, plug, and flexible wire harness of appropriate length for any movement of the boiler. The harness shall connect directly to conduit with standard pipe threads without the use of thread adapters. All indicating lights shall be waterproof oiltight units with 110-6-volt transformers for use with 6-volt bayonet base lamps. All connectors shall be oriented vertically. 1114
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All connectors shall be compatible with American Brass Sealtite extra flexible conduit and fittings, except where special precautions for high temperatures or mechanical strength are required. 1122
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All connectors used in construction shall be available in Utah. 1126

20.5 Switches: All burner equipment position and limit switches shall be National Acme Company Snap-Lock Heavy-Duty Series D 2400X with electrical contact ratings of 10 amperes, 120 volts ac, and also complete with suitable operating levers. 1129
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20.6 ~~Burner Accessory Equipment:~~ ~~The Contractor shall furnish and install the following:~~ 1134

20.6.1 Burner Positioning Assembly: Complete positioning assembly as required to position burners for firing or temperature control over the entire firing range. The assembly shall be actuated by either an electric or a double-acting piston cylinder drive with a positioner and 2 suitable limit switches for each firing position that is required by the Contractor for the operation of the burner. 1137
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20.6.2 Flame Detectors: Flame detectors shall be furnished as required to safely monitor flame conditions and shall be furnished with instruments to activate alarm contacts in the event of flame failure. The flame detection system shall 1144
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provide reliable indication of the burner flame conditions at all loads. Each detector shall be provided with protective devices that will permit the removal of the flame detector while the boiler is in operation. 1147 1148

Detector electronic circuits shall be solid-state. 1150
Flame detector amplifiers shall be mounted in a cabinet suitable for installation in a terminal room. 1151

20.6.3 Ignitors: 1153

20.6.3.1 Oil-Electric Ignition System: A waterproof air atomized oil-electric ignition device for each burner shall be furnished. Each burner ignition device shall be suitable for local or remote operation. Each burner ignition device shall operate satisfactorily with the burner registers open at all loads from cold start-up to Maximum Capacity under all boiler operating conditions. Each ignition device shall be self proving or shall be equipped with a light sensitive type flame detection system, integral flameout shutoff controls, automatic oil purge operation when ignitor is shut down, and sequence indicating lights. Detectors shall respond only to the flame under surveillance and not to adjacent flames or to infrared radiation from glowing refractory. Each ignition device shall be furnished with supply safety shutoff valves for fuel oil and atomizing air for connection to the IPA furnished fuel oil and atomizing air piping. Each ignitor shall have an air supply adjustment. The operation of this air supply adjustment shall be independent of the ignitor air supply to the other ignitors and independent of the main burner air supply. 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167

"A dual split-range control valve station shall be furnished for installation in the Owner-furnished main lighter oil piping. The control valve station shall be capable of modulating igniter oil flow from single-burner level reduced capacity operation, to eight burner level full-capacity operation. The oil-electric ignition system shall be designed to meet the following requirements.

- (a) The output from the Owner-furnished pneumatic pressure controller will be tubed directly to the valve positioners. The control valve positioners shall be designed to be calibrated for providing split-range control.
- (b) The Contractor-furnished burner management control system shall provide contact closure outputs to direct the Owner-furnished control system as to which pressure set point (full capacity or reduced capacity) is required for various boiler operating conditions.

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- (c) The Contractor-furnished burner management control system shall include pressure instruments to perform monitoring of proper oil pressure and any required interlocking within the burner management control system.
- (d) The low-flow conditions control valve shall be sized to be approximately 70 per cent at the two-burner level full-capacity flow conditions.
- (e) The Contractor shall erect Owner-furnished accumulators if accumulators become necessary for the fuel oil piping included within the Contractor's scope of supply.
- (f) Each control valve shall be furnished with manually operated inlet and outlet isolation valves for installation in the Owner-furnished main lighter oil piping."

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20.6.3.2 Plasma Torch Direct Ignition System: The 1170
boiler shall be equipped for the future installation of a Plasma
Torch Direct Ignition System utilizing one plasma torch ignition 1171
per burner. FOR UNIT ONLY PER AA-CO1.5

If the Option for a Plasma Torch Direct Ignition 1173
System is exercised, the Contractor shall furnish an electric 1174
ignition system capable of igniting coal burners and stabilizing
coal burner operation for boiler start-up and warm-up from the 1175
time primary air temperature and secondary air temperature is
130F to a stable load condition of 25 percent of Maximum 1176
Capacity, without the use of fuel oil. Such system shall 1177
include not less than 2 independent plasma torch ignition
groups, each group dedicated to a burner row. 1178

20.6.4 Warm-Up Burners: 1180

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

20.6.4.1 Oil Warm-Up Burners: If required by boiler design, the Contractor shall furnish all required warm-up burners. Warm-up burners shall be air atomized and use the same fuel as supplied to the igniters. Each warm-up burner shall be suitable for remote operation and shall be equipped with a flame detection system, integral flamecut shutoff controls, automatic oil purge operation when burner is shut off, and sequence indicating lights. Each warm-up burner shall be furnished with supply safety shutoff valves for fuel oil and atomizing air for connection to the IPA furnished fuel oil and atomizing air piping. 1183 1184 1185 1186 1188 1189

20.6.4.2 Coal Warm-Up Burners: The boiler shall be equipped for the future installation of a Coal Warm-Up Burner System having the characteristics of the option described in Section 3 of the Contractor's Proposal and titled "P.C. Burner Start-Up System". 1192 1193

20.6.5 Air Registers: The air registers as referred to herein shall be that portion of the burner which admits air to the burner. 1196 1197

Air registers manipulated during operation of the boiler shall be furnished with either an electric or a double-acting piston cylinder drive equipped with a positioner and 2 limit switches for each register position that is required by the Contractor for operation of the air register. This assembly need not comply with the requirements of Subarticle 22.2 of this Division. 1199 1200 1201 1203

Air registers shall be provided with a means to disengage the register from its controller for local manual operation of each register. 1205 1206

All electrical connections and devices shall be waterproof. 1208

20.6.6 Option to Furnish Full By-Pass System: If the option for furnishing a Full By-Pass System referred to in the Execution Document is exercised, the Contractor shall furnish and deliver each Boiler Unit as described in Section 2 of the Contractor's Proposal under the Item titled, "Full By-Pass System". 1211 1212 1213

20.6.7 Option to Furnish Partial By-Pass System: If the option for furnishing a Partial By-Pass System referred to in the Execution Document is exercised, the Contractor shall supply a start-up and superheater by-pass system to reduce 1216 1217

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ITEM 1

start-up time. This system shall include a superheater by-pass to the condenser and reheater outlet steam attenuator. 1218

This system shall be designed for a 5 percent of Maximum Continuous Rating steam flow. 1220

"The Partial Bypass System control valves shall be as manufactured by Copes-Vulcan."

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Item 7

The Contractor shall terminate the system complete out to the boiler column steel and at the elevation of the primary superheater inlet header. 1222
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20.7 Fuel Handling Equipment: 1225

20.7.1 Coal Monitors: The downspout above each feeder shall have 2 Merrick Scale Mfg. Company nuclear coal monitors. Upon loss of coal flow from the silo, the upper monitor shall give an indication of lack of coal flow and provide a control signal to start a silo vibrator furnished by the IPA. If coal flow is not restored, the lower monitor shall shut down the feeder before the head seal is broken. 1228
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The monitors shall have a response time of less than one second upon loss of coal flow and 2 seconds or less upon reestablishment of coal flow. 1233
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The monitors shall have a gamma radiation source and Geiger Mueller tube detector in a single frame providing proper alignment. The monitors shall be complete with adequate shielding, a control box, indicating lights, test switches, logic circuitry and terminal blocks for plant annunciator, silo vibrators, and coal feeder interlocks. Each monitor shall be capable of being tested and calibrated without shutting down the feeder or turning on the vibrator. 1236
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Each monitor shall have an indicating light and contacts for remote indication that the monitor is ready to operate, that it has supply power, and that it is not being calibrated. 1243
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20.7.2 Coal Feeders: At least one feeder shall be furnished to supply coal for each pulverizer. Feeders shall be Merrick Scale Mfg. Company gravimetric type suitable for indoor installation. 1247
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Each feeder shall be complete with variable speed motor, gear reducer and speed control, separate control cabinet, cleanout conveyor, and coal rate indicator and integrator with meters suitable for remote panel counting. 1250
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Each feeder shall be designed to be controlled manually from the remote control panel and automatically in accordance with the Boiler Turbine Control System signals. 1254
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The coal feed belt shall be replaceable without disassembly of the housing. Clean-cut conveyor shall discharge to the feeder outlet. 1257
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All feeder parts in contact with coal shall be an austenitic Type 304 stainless steel or fire-resistant rubber. 1260
All bearings shall be equipped for pressure lubrication from outside the feeder housing. Feed belt takeup and adjustments for tracking shall be operable from outside the feeder. 1261
1262
Provisions shall be provided for inspection of the interior of the feeder without affecting feeder operation. 1263

Feeder flow output signals, proportional to feeder delivery rate of coal, shall be provided for the combustion controls. Each feeder shall be equipped with coal stoppage switches to stop the feeder and to alarm either if no coal is flowing or if the feeder discharge is flooding. A pressure tap connection shall be provided in the feeder suitable for measuring differential pressure between feeder and pulverizer. 1265
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Feeders shall have provisions for future installation of permanently connected internal fire protection equipment using steam or carbon dioxide without drilling through the feeder housing. 1272
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ADD PER
C.O. # 2
ITEM 19A) "The seal air supply to each feeder shall include a primary isolation damper. Each primary isolation damper shall be provided with a power actuator."

20.7.3 Pulverizers: Pulverizers shall pulverize, dry, and classify the coal for satisfactory burner operation. 1276
Each pulverizer shall be capable of supplying coal pulverized to not less than 70 percent through a 200 mesh USS sieve and 99 percent through a 50 mesh USS sieve throughout its required coal output range and until after the pulverizer is in a worn condition. Coal fineness shall be independent of output. Each pulverizer shall provide quick response to required output changes. 1277
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Pulverizers shall be furnished complete with motors, couplings and guards, lubrication system, and local panel-mounted control equipment. 1282
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Pulverizers shall have provisions for future installation of permanently connected internal fire protection equipment using steam or carbon dioxide without drilling through the pulverizer casing. Pulverizers shall have no areas for coal to accumulate. 1285
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Pulverizers shall have instrument taps for CO monitoring. 1289

Pulverizers shall be capable of starting when full of coal. 1291

Grinding parts shall be of impact and wear-resistant materials suitable for long service life and shall be easily replaceable. 1293
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Coal fed to pulverizers will not be greater than 1-5/8 inches. 1296

"An independent lubricating oil package shall be furnished for each pulverizer which shall be capable of supplying the required amount of lubricating oil to the pulverizer at maximum load. Each package shall be complete with dual full-capacity oil filters, a water-to-oil heat exchanger, and an oil pump with motor. The filter shall be cleanable or replaceable without interrupting oil flow. The heat exchanger shall have 90-10 copper-nickel tubes and bronze tube sheets, and shall be designed for 105 F cooling water. The pump motor shall be 480 volt, three-phase, TEFC. The complete package shall be factory-wired, assembled, and mounted on a common base."

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"Pulverizer gear boxes shall be as manufactured by Hitachi Limited of Tokyo, Japan. One spare gear box shall be furnished with Boiler Unit 1 only. Inspection and testing of the pulverizer gear boxes shall be in accordance with the following clarifications.

- (a) Any additional testing requested by the Engineer other than the Contractor's standard requirements for gear fabrication and assembly will be done at the IPA's expense.
- (b) The Contractor shall work with the Subcontractor to establish a production schedule and inform the Chief Quality Assurance Engineer of this schedule.
- (c) The Contractor and the Subcontractor shall provide for the following activities during the Chief Quality Assurance Engineer's first inspection trip.
 - (1) Demonstration of ultrasonic testing (UT) of gear forgings.
 - (2) Review of material control, heat treatment, and non-destructive examination (NDE) records of three previously completed gear sets.

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- (3) Check of grinding control operations used to prevent decarborizing.
 - (4) Verification of use of the Contractor's Purchasing Specification for MPS pulverizer gear drive assembly - 10A - 1A5 (FPG), 6R211, 6R61, including the Contractor's inspection plan.
 - (5) Review of heat treatment facilities, controls, records, and calibration history.
 - (6) Inspection of a gear box housing in assembly showing:
 - [a] Weld preparations
 - [b] In-process welding
 - [c] After weld inspection using the Contractor's QA Procedure No. 1004-V.I-102
 - [d] Magnetic particle procedure and capabilities to identify defects in gears
 - [e] IPA gears in grinding
 - [f] Magnetic particle testing of IPA gears
 - [g] Gear box shipping procedure
 - (d) The Contractor and the Subcontractor shall provide for the following activities during the Chief Quality Assurance Engineer's second inspection trip.
 - (1) Spin-testing of first four gear boxes, plus the one spare gear box for Boiler Unit 1.
 - (2) Inspection of the remaining four gear boxes which shall be at the following stages of fabrication.
 - [a] Housing in welding fit-up
 - [b] Housing in welding
 - [c] Housing ready for weld inspection
 - [d] Housing in machining
 - [e] Housing in hydro static testing
 - [f] First-tested units packaged for shipping

- (e) The Contractor and the Subcontractor shall provide for the following activities during the Chief Quality Assurance Engineer's third inspection trip.

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- (1) Spin-testing of the remaining four gear boxes.
 - (2) Check of all gear boxes that are ready for shipment.
 - (3) Inspection of any gear boxes in assembly prior to above spin test.
- (f) The Contractor and the Subcontractor shall ensure that all inspection items listed for each trip are ready for inspection on the scheduled arrival date of the Chief Quality Assurance Engineer. Notification shall be given ten working days in advance of the arrival date. Should more than the above three trips be required, the same provisions shall apply."

20.7.4 Option for a Pulverizer Replacement Parts Package (PRPP): If the option for the Pulverizer Replacement Parts Package referred to in the Execution Document is exercised, the Contractor shall furnish all replacement parts required to maintain operation of all pulverizers for a Boiler Unit for a period of 7 years beginning when a Boiler Unit has been accepted. Each pulverizer replacement part shall be new and shall be interchangeable with and of the same material and workmanship as the corresponding part included with the equipment furnished under these specifications. All pulverizer replacement parts shall be stored at the plant site and shall become the property of the IPA at the end of the 7-year pulverizer replacement parts period of the final Boiler Unit.

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20.7.5 Coal Downspouts, Valves, and Piping: All necessary coal downspouts, valves, piping, and hangers from the coal silos to the burners shall be provided.

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valves shall be provided at each silo outlet to suit the required arrangements. Valves shall be Merrick Scale Mfg. Company. valves shall have openings free of internal braces and other barriers and flanged inlets and outlets. Each silo outlet valve shall be provided with 2 limit switches for position indication.

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"Valve body shall be an austenitic Type 304 stainless steel in areas in contact with coal flow. Each silo outlet valve shall be provided with a motor operator."

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Downspouts shall be provided from the silo outlet coal valve to the feeder inlet and from the feeder outlet hopper to

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the pulverizer. Downspouts shall be vertical and shall be provided with quick-disconnect couplings and with an austenitic Type 304 stainless steel in areas in contact with coal. Each downspout shall be furnished with a removable piece in its upper section to permit insertion of a coal diverter chute for emptying the coal silo.

Piping from the pulverizer outlet shall provide equal distribution of the coal and air mixture to the burners. Coal piping shall be furnished with quick-disconnect couplings. Each elbow and bend, and not less than 5 feet of straight pipe following each elbow and bend, and the vertical straight pipe from the pulverizer to the first bend shall be ceramic lined with B&W Cera-Vam. The ceramic lining shall be not less than one inch thick. The inside diameter of the ceramic lining shall match the inside diameter of the unlined portion of the piping. Coal air mixture velocity in the coal piping to the burners shall be not greater than 85 fps under any circumstances.

A manually operated swing valve shall be provided in the coal piping to each burner, at the burner joint, in addition to a valve at the pulverizer outlet.

"The swing valves shall be provided with seats made from Elverite I material."

"20.8 Lighter Maintenance Tools. Furnish one (1) set of lighter maintenance tools per burner row (total of eight [8] sets per boiler). Each set of tools shall include the following.

Number Required	Description
1	Atomizer Bracket
1	Barrel Wrench
1	Internal Tube Wrench
1	Sprayer Head Wrench
1	End Cap Wrench"

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21. Fans and Blowers: 1340

21.1 General: Each fan and blower shall be complete with electric motor, coupling, evase, control and isolation dampers, and damper control drives. ~~Each fan shall permit an~~ Primary air fans shall be suitable for indoor service and mounted at grade level.

21.2 Operating Conditions: A fan unit shall not have a vibration in any plane greater than 1-1/2 mils, peak-to-peak, as measured on the bearing housings of the fan and motor nor shall the displacement exceed the region shown as "GOOD" on the General Machinery Vibration Chart published in Vibration Tolerances for Industry by R. L. Baxter and D. L. Bernhard, ASME Publication 67-PEM-14, presented at the ASME Plant Engineering and Maintenance Conference, Detroit, Michigan, April 10-12, 1967 (also published as Curve 305D by IRD Mechanalysis, Inc., 6150 Runtley Road, Columbus, Ohio 43229). The design resonant speed shall be not less than 30 percent above the maximum operating speed of the assembled unit. The design resonant speed is defined as that speed equal to the natural frequency of the combined spring-mass system of the rotor, bearing housings, oil film, and Contractor-furnished bearing pedestal but excluding the IPA-furnished reinforced concrete foundation. The critical

speed is defined as that speed equal to the natural frequency of the combined spring-mass system of rotor, bearing housing, oil film, and bearing pedestal, but excluding the reinforced concrete foundation. 1362
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Rotor tip speed of each fan shall not exceed 35,000 fpm. All fan wheels with tip speeds greater than 25,000 fpm shall be stress relieved after fabrication. Each fan shall be capable of continuous operation at any load from 15 percent of test block capacity to test block capacity and shall be suitable for sudden load changes within these limits. Each fan shall have no inflection points in its head-capacity curve and shall have a nonoverloading horsepower characteristic. If applicable, fans shall be designed to operate smoothly in parallel. 1365
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Equivalent A-weighted sound level shall not exceed 85 dB measured at a distance of 5 feet from each fan inlet. If the fan complies with the aforementioned requirements, the IPA will be responsible for OSHA compliance. 1373
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21.3 Fan Housings: Each fan housing shall be of steel plate supported by a steel frame with reinforced steel ribs to prevent warping, drumming, and vibration. The housings of all fans shall be split, fitted with lifting eyes, and companion joints designed to facilitate the erection and removal of the fan rotors. All permanent joints shall be continuously seal welded. Fan inlets shall be easily removable. 1378
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"A horizontal 8-inch NPT drain connection shall be provided at the low point of each primary air fan scroll. A horizontal 4-inch NPT drain connection shall be provided at the low point of each fan scroll for all other fans."

Suitable supporting bases shall be furnished on fan housings. The bases shall be provided with the necessary bolt holes for anchoring to the IPA's foundation. 1387
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Manhole openings shall be provided in the scroll cases. These manhole openings shall be air tight and provided with suitable quick operating latches for the removal of manhole covers. 1390
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All sections of the housings shall be matched and identified by markings for erection. These markings shall be legible when the sections are ready for shipment and shall be firm so that they will not be erased during transit. 1394
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21.4 Fan Rotor: The fan rotor shall be of all welded construction. Tie rods shall not be used. Rotor hubs shall be steel and keyed to the shaft. Details of construction shall be such as to avoid pockets on which foreign matter may be 1399
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accumulated. Nonweldable alloy steel shall not be used in the construction of the fan rotor. 1403

The fan shafts shall be forged, normalized, and tempered before turning and grinding to standard tolerances. 1405

The fan rotor including couplings shall be dynamically balanced at the factory to a level such that the residual unbalance is less than that given in the following table or as required for reliability and longevity, whichever requirement is more stringent: 1407
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Maximum Level of Residual Unbalance 1413

Operating Speed (RPM)	Maximum Residual Unbalance Per Unit of Rotor Weight (Lb-In/Lb)	Maximum Residual Force on Bearing (Lb)	
600	0.0039	0.040 Fs	1420
720	0.0033	0.048 Fs	1421
900	0.0026	0.060 Fs	1422
1000	0.0024	0.067 Fs	1423
1200	0.0020	0.081 Fs	1424

Where: Fs is the static force of gravity on bearing (lb) 1426
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21.5 Fan Dampers: Each fan shall include outlet dampers and inlet dampers or vanes for isolating the fan and for controlling flow. The dampers or vanes shall be capable of controlling the flow from 10 percent flow to full load flow. Each set of dampers and damper drives shall be mounted in a structural steel frame with inlet and outlet flanges and designed for easy removal for repairs. 1432
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21.6 Couplings: Each fan unit shall be provided with Fast's flexible couplings between the shafts to be coupled. 1438

The couplings shall be capable of absorbing the thermal expansion of the coupled shafts without transmitting thrust to any bearings. 1440
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The couplings shall be of ample size to transmit the driving force and to withstand shock. The couplings shall be fitted and keyed to the shaft and balanced with the rotor before shipment. 1443
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21.7 Coupling Guards: A suitable coupling guard completely covering each coupling and the exposed portion of 1447

each rotating shaft and complying with the requirements of the State of Utah shall be furnished for each coupling of each fan. The coupling guard shall be provided with a removable plate or other equivalent means for inspection and oiling.

21.8 Sole Plates: Steel sole plates for each fan bearing pedestal shall be provided. Bearing pedestals shall be bolted to the IPA foundation by means of anchor bolts extending through the sole plates.

21.9 Primary Air Fans: Primary air fans shall be provided as necessary for proper boiler operation. With one primary fan out of service the remaining fans shall be capable of providing sufficient primary air to permit boiler operation up to not less than 60 percent of Maximum Capacity with each of the specified coals. Test block performance of each fan with inlet boxes and silencers shall be greater than its expected operating performance by not less than 25 percent for weight flow, not less than 50 percent for static discharge pressure, and not less than 25F for temperature at the plant's elevation for each of the specified coals.

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"The primary air fans shall be of the full shrouded type with backwardly curved airfoil blades and shall be double width, double inlet. The fans shall have inlet boxes complete with silencers. Expansion joints shall be provided between the inlet boxes and the silencers. An annubar and two thermocouples shall be provided in each inlet box for measuring the primary airflow."

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The bearings shall be of the self-aligning, split sleeve type capable of withstanding high thrust loads due to any unbalanced forces on the fan wheel. The bearings shall be cooled with oil from the lubricating oil package specified herein. The bearing lubrication system shall be of the flow-through flood type.

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"The primary air fans shall be provided with inlet and outlet silencers and acoustical insulation and lagging on the fan housing and discharge ductwork between the silencers."

An independent lubricating oil package shall be furnished for each fan and motor unit. Each lubricating oil package shall be capable of supplying the required amount of lubricating oil to the fan and motor bearings at test block conditions. & SEE MOP. PARAGRAPH #027

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Each package shall be complete with dual full-capacity water-to-oil heat exchangers, dual full-capacity oil filters, and dual full-capacity pumps and motors. The filter shall be cleanable or replaceable without interrupting the oil flow. The complete package shall be factory-wired, assembled, and mounted on a common base. The packaged system shall be arranged and wired such that either pump may serve as the main supply pump while the other pump serves as the standby pump.

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The heat exchangers shall have 90-10 copper-nickel tubes and bronze tube sheets and shall be sized for 105F cooling water. 1485 1486

The oil reservoir tank shall be coated internally with Rustban or other commercially available rust inhibitor. The reservoir shall be complete with dual 480-volt, 3-phase, 60-hertz, electric heaters and an oil level site gage. The heaters shall be complete with in-line full voltage adjustable thermostatic or combination thermostat and contactor controls capable of interrupting the heater circuits. The heaters shall automatically maintain the temperature of the oil in the reservoir at the selected temperature when the fan is idle and the ambient temperature is as low as -30F. The entire oil reservoir electric heater circuit shall be factory-wired to terminals in the common junction box so that only connection of 480-volt supply is necessary to complete the heater circuit. A metal barrier shall be provided in the junction box between terminals for the 480-volt supply and terminals for the control circuits. 1488 1490 1492 1493 1494 1495 1496 1497 1498 1499

Each lubrication package shall be furnished complete with all instrumentation and control devices required for monitoring and control. All devices shall be mounted, piped, and wired as part of the package to comprise a complete system. 1501 1502 1503

PER C.O. #2 { "All devices, except those used for heater control, shall have their contacts wired to terminals in the common junction box for connection by the IPA."

The devices shall include, but not be limited to, the following: 1504

- (b) Divi
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- (a) One low-pressure switch for alarm. 1506
 - (b) One high temperature switch for alarm. 1508
 - (c) One permissive start pressure switch for fan motor. 1510
 - (d) One low-pressure trip switch. 1512
 - (e) One low-pressure start switch for each lube-oil pump. 1514
 - (f) One low temperature switch for alarm. 1516
 - ~~(g) Two standby automatic pump selector switches~~ 1518
~~contactors.~~ PER C.O. #2
 - (h) One level switch for oil reservoir low level alarm. 1520

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(i) Two full-capacity immersion type heaters or a single heater that will be serviceable with the primary air fan operating. A spare heating element shall be furnished. 1522
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(j) Thermostats. 1526

(k) Flow indicators. 1529

(l) Pressure gages. 1530

(m) Temperature gages. 1532

(n) Level gages. 1534

Pump selector switch ~~developments~~ will be provided to ~~the Contractor~~ by the IPA. 1536

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"Motor starters for pumps and auxiliary relays required for pump control will be provided by the IPA."

At the driven end of the fan shaft, suitable thrust bearings shall be provided to locate the shaft longitudinally and to compensate for end thrust under any condition of operation. 1540
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Connector lead type resistance temperature detectors (RTD) shall be furnished and installed on each bearing. 1543

Pillow blocks shall be carried on pedestals independent of the fans. Should cast-iron pillow blocks be furnished, these shall be of good quality iron, free from defects, imperfections, blow holes, or cracks. No patching or welding will be permitted unless specifically approved by the Engineer. 1545
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Bearing pedestals shall be of heavy, rigid, steel plate construction, mounted on sole plates to facilitate removal of the motor bearings without disturbing the alignment of the fans or driving motors. 1550
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The Contractor shall furnish asbestos gaskets or pressure sensitive gasket material for all bolted flange joints and manhole joints of the fan housings. 1553
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The gaskets for the flange joints at the discharge connections to the duct work shall be such that after the connections have been securely bolted and the gaskets compressed the gasket thickness shall be 3/16 inch or greater. 1556
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DIVISION G3

Spec. 2010N
Revised May 29, 1981
DETAILED REQUIREMENTS FOR ITEM 1

All exposed parts of the shaft shall be polished and 1560
the wheel hubs, fan blades, and shrouds shall be smooth and 1561
uniform and of such contour as to offer the least resistance to
the flow of gases or air. Castings shall be carefully dressed 1562
down and filled.

21.10 Blowers: Contractor shall furnish all blowers 1565
required to seal, cool, vent, or purge components furnished by
the Contractor except components otherwise specified as being 1566
furnished with the required air by the IPA. Blowers shall 1567
include spare capacity as required to maintain boiler capability
from start-up to Maximum Capacity upon failure of any one blower 1568
or drive.

22. Control Equipment: Except for the equipment 1571
under Subarticle 22.6 of this Division, the following control 1572
equipment shall be furnished:

22.1 Dampers: The maximum allowable deflection of 1575
damper blades under all service conditions shall not exceed
1/360 of the span. Control dampers used for throttling service 1576
shall be of the counter-rotating type.

All damper bearings shall be so mounted as to prevent 1578
binding of the shafts because of thermal expansion or 1579
misalignment.

Each damper operating shaft shall be provided with 1581
keyways in each end and shall be supported in easily lubricated 1582
anti-friction bearings. All damper shafts shall show damper 1583
position and shall have open and closed positions clearly
indicated.

Each damper blade and inlet vane shall be continuously 1585
overlapping with no fixed division plates, and shall be of the 1586
design that is rigid, and that will operate free from flutter or
vibration during all modes of operation. The Contractor shall 1588
provide a means of lubrication to individual inlet vanes to
ensure free and trouble free operation of the inlet vanes. 1589

If the damper and inlet vane shafts operate in 1591
sleeves, provisions shall be made to eliminate infiltration of 1592
dust and moisture between the shaft and the sleeve. The 1593
Contractor shall provide a positive means of determining the
position of the dampers.

Torque requirements for damper and inlet vane 1595
mechanisms shall be held to as low a value as practicable.

The gas biasing control dampers shall be standard 1597
louwer dampers having a cast iron sleeve type self lubricating 1598
bearing located inside the housing.

All other damper, inlet vane, and linkage bearings 1600
shall be either the oil-impregnated bronze sleeve type or the
permanently lubricated and sealed ball bearing type. The 1602
bearings shall be sealed against the entrance of dust or water.
Each set of dampers, inlet vanes, and associated linkage shall 1603
operate with minimum friction. Control drives shall be 1604
furnished for operating the dampers.

22.2 Control Drives: A control drive shall be 1607
furnished for each control device manipulated during operation
of the boiler. All control drives shall be electrically operated.

The electric drives furnished shall be equipped with all
required drive electronics and shall be waterproof and
dustproof.

22.2.1 Modulating Drives. Drives for air registers, fan and
duct dampers, and wind box compartment dampers which must be
modulated during operation shall be of the modulating electric
type. All drives shall be electronically position controlled.
The IPA's coordinated control systems will produce electric
drive position demand signals. Control drives shall be com-
patible with these signals, and shall provide position feedback
signals as required by the coordinated control systems. Each
drive shall be furnished with four limit switches, adjustable
over the full travel of the drive. These limit switches shall

be wired to terminal blocks and shall be available for use by
the IPA. All power switching equipment and electronic equipment
required for operation of the drives shall be provided installed
in separate NEMA 12 cabinets for installation in appropriate
power plant areas separate from the actuators themselves.

Drives shall be furnished complete with all required mounting
bases, connecting linkage, and accessories required for opera-
tion. Drives shall be equipped with housings suitable for outdoor
installation. All damper drives installed outdoors shall be
equipped with space heaters complete with thermostatic control.

The gas biasing damper drives shall be direct mounted Limitorque
modulating dampers as manufactured by Philadelphia Gear Corpora-
tion in accordance with the following.

Damper No.	Damper Application	Per Unit	Type
761	Gas Biasing Damper, primary superheater side	6	SMC-03-7-1/2/H3BC Modutronic 30.3 drives
762	Gas Biasing Damper, reheater side	6	SMC-03-7-1/2/H3BC Modutronic 30.3 drives

All other modulating drives shall be as manufactured by Foxtoro in accordance with the following.

B&W Damper No.	Damper Application	Quantity Per Unit	Type
731	Primary Air Temperature Control	8	SM5260/AD7310
732	Tempering Air Control	8	SM5260/AD7310
736	Primary Air Volume Control	8	SM5260/AD7310
718	Primary Air Fan Inlet Vane Control	2	SM5460/AD7320
741	Secondary Air Control	16	SM5360/AD7310
776	Primary Air Heater Gas Inlet Isolation	2	SM5360/AD7310

Control drives shall utilize the IPA's 480 volt, 3 phase auxiliary power source.

22.2.2 On-Off or Jogging Drives. Drives for burner retract mechanisms, isolating dampers, or other driven devices not requiring modulation shall be of the on-off or jogging type.

Each electric motor drive shall be equipped with 460 volt, 60 hertz, 3 phase motors. Each drive shall be equipped with four limit switches, adjustable over the full travel of the drive. Position feedback transmitters shall be furnished where required by the drive's control system. Limit switches and position transmitters shall be wired to terminal blocks, and shall be available for use by the IPA. Motor starters shall be provided installed in separate NEMA 12 cabinets for installation in appropriate power plant areas separate from the actuators themselves.

Drives shall be furnished complete with all required connecting linkage and accessories required for operation. Drives shall be equipped with housings suitable for outdoor installation. All damper drives installed outdoors shall be equipped with space heaters, complete with thermostatic control.

The drives shall be Limitorque actuators as manufactured by Philadelphia Gear Corporation in accordance with the following.

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Damper No.	Damper Application	Quantity Per Unit	Type
711	Secondary Air Heater Inlet Isolation	4	SMC-04-3-1200/H1BC
714	Secondary Air Heater Outlet Isolation	2	SMC-04-5/H3BC-2.86
719	Primary Air Fan Outlet Isolation	2	SMC-04-3-1200/H1BC
721	Primary Air Heater Inlet Isolation	2	SMC-04-3/H1BC-2.86
724	Primary Air Heater Outlet Isolation	2	SMC-04-3/H1BC-2.86
735	Pulberizer Isolation	8	SMC-04-5/H2BC-2.86
772	Secondary Air Heater Gas Inlet Isolation	4	SMC-04-5/H2BC-2.86

Control drives shall utilize the IPA's 480 volt, 3 phase auxiliary power source."

Pricing addition for Units 1 and 2 is as follows.

	Material \$	Erection \$	Total \$
Unit 1	33,000.00	-0-	33,000.00
Unit 2	33,000.00	-0-	33,000.00
	66,000.00	-0-	66,000.00

22.3 Spray Desuperheaters: Each spray desuperheater shall be equipped with 2 independent valve stations piped in parallel. Each valve station shall contain a full capacity spray control valve, a motor-operated block valve, and an upstream and a downstream isolator valve.

Each spray desuperheater shall also be equipped with spray nozzles, nozzle headers, and thermal sleeves."

"The reheat spray desuperheater shall be furnished completely installed in a section of the IPA's 46 inch OD cold reheat pipe. This pipe section will be shipped to the Contractor

for installation of the spray nozzles, nozzle headers, and thermal sleeves. The Contractor shall ship the reheat spray desuperheater assembly to the plant site for erection under separate specifications."

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ITEM 15B

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Feedwater used in the spray desuperheaters will contain not more than 0.30 ppm total dissolved solids exclusive of ammonia and hydrazine.

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22.4 AUTOMATIC TEMPERATURE PROBE:

"Automatic temperature probes for monitoring the furnace outlet flue gas temperature shall be suitable for operation at 1,550 F. The temperature probes shall be designed for operation nonair-cooled for temperatures to 1,050 F and air-cooled for temperatures above 1,050 F. Position transmitters for remote indication and all necessary limit switches for automatic positioning of the probe shall be provided. Temperature probe lance material shall be stainless steel."

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ITEM 11

1150F. Position transmitters for remote indication and all necessary limit switches for automatic positioning of the probe shall be provided.

22.5 Air Flow Primary Elements: All necessary air flow primary elements shall be provided; as required by the Contractor, to control the fuel air ratio of his equipment. Each primary element shall be designed to produce a differential pressure of approximately 3.2 inches of water when measuring the flow required for combustion at Maximum Capacity.

22.6 Equipment Furnished by the IPA: Unless otherwise specified herein, the IPA will furnish the following:

(a) Control room instrumentation, manual auto stations, switches, indicators, and recorders.

(b) Interconnecting control air tubing and electrical wiring.

(c) Pneumatic pilot valves and solenoid valves for the operation of control valves.

(d) All oil and atomizing air piping, valves, and hangers outside the windbox up to the supply safety shutoff valves.

(e) All tube temperature thermocouples and terminal heads with screw cap covers and extension necks for the temperature control points and permanently installed test points.

23. Instrumentation and Control Systems:

23.1 General: The boiler shall be provided with all temperature, pressure, and flow connections, and all other instrument and control connections on the piping and equipment furnished by the Contractor that may be required for an ASME Boiler Acceptance Test; for fan, pulverizer, and boiler circulation pump performance tests; to meet contract requirements; and for combustion, steam temperature, feedwater, and start-up controls. All instrument primaries, except for tube temperature measurements shall be accessible during boiler operation.

23.2 Design Criteria:

23.2.1 General Requirements: Process and instrumentation diagrams shall use system and function notations

to identify control loops and instruments in accordance with Drawing MDC56-94-80 and ISA S5.1 Standard.	1672
Binary control logic schematics shall be drawn using symbols in accordance with ISA S5.2 or NEMA ICS1-102 Standards.	1674 1675
Analog schematics shall be drawn using symbols in accordance with ISA or SAMA Standards.	1677
All instruments, primaries, and control devices shall be identified by system, function, or designation in accordance with schematic, process, or instrumentation diagrams. The identification shall be stamped on the control device or on stainless steel tags permanently attached to the control device. Electrical components shall be sufficiently identified on printed circuit boards to facilitate troubleshooting and servicing the equipment.	1679 1680 1681 1682 1683 1684
Instrument connections shall be in accordance with Drawings SL-MD53 through SL-MD62.	1686
23.2.2 Detailed Requirements: All transmitted electrical control signals shall be 4 to 20 mA. Electric power to operate the control devices will be 60-hertz, 120 volts ac. Pneumatic modulating final devices shall be designed for 60-125 psi varying pneumatic power supply. Pneumatic devices shall be provided with an I/P converter for operation with a 4 to 20 mA control signal. Pneumatic control signals shall be 3-15 psi.	1689 1690 1691 1692 1693
All instrumentation and controls shall be capable of operating satisfactorily under normal power plant operating conditions including, but not limited to, the following:	1695 1696
(a) Vibration occurring in generating stations during start-ups, synchronous operation of the Boiler Unit, and seismic conditions at the plant site.	1698 1699
(b) Relative humidity conditions between 10 and 90 percent. All field instruments shall be mounted in weatherproof NEMA 4 metal enclosures.	1701 1702
(c) Ambient temperatures specified. Heaters and air-conditioning units shall be provided to maintain the operating temperature of the equipment if the permissible limits are exceeded. Instrument lines subject to freezing shall be insulated and traced. Electric tracing shall have a lockable power shutoff switch.	1705 1706 1707 1708

Insert control panels for installation in the control room shall have a maximum height of 18 inches. 1710

Amplifiers, power supplies, and auxiliary electrical equipment shall be mounted and wired in control and terminal cabinets and shall be easily accessible. Terminal blocks, junction boxes, and cabinets shall have a 25 percent spare capacity. Junction boxes and cabinets shall be NEMA 2 for indoor installation and NEMA 4 or NEMA 12 for outdoor installation. The input-output wiring shall be connected to numbered terminal blocks for wiring interfaces between externally mounted equipment and instrumentation. Electronic circuits shall be solid-state construction. 1712
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Locally mounted process gauges shall have dials 3-inch or larger with black numerals on white faces. Division marks at one percent intervals with measurements in English units. The maximum operating range shall be approximately 80 percent of the range of the gauge and the accuracy ± 3 percent of span. Repeatability and readability shall be ± 1 percent of span. 1720
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Instrumentation for remote indication/control shall have a linearity and overall accuracy of ± 0.5 percent of span, a repeatability and hysteresis/deadband of ± 0.1 percent of span, a temperature effect of 0.3 percent of span maximum, and a minimum ± 20 percent of range zero/span adjustment. 1726
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All transmitters shall be of the 2-wire type with a separate power supply designed for a minimum load impedance of 750 ohms, and all control signal receivers shall have a maximum input impedance of 250 ohms. 1730
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Thermocouple temperature transmitters shall have an accuracy and repeatability of 0.1 percent of span, shall have a temperature effect of 0.01 percent of span per deg F, and shall be temperature compensated or shall have a controlled reference junction temperature of 150F. 1733
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All control circuits shall be provided with alarms to indicate loss of power, open circuits, malfunctions, when limits are exceeded or back-up systems are brought in service. 1737
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External connections shall be brought out to a common terminal strip with threaded fasteners for connection to No. 16 AWG conductors. 1740
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General purpose relays shall be Struthers Dunn Company No. 219 with dust covers. All contacts shall be CPDT and rated a minimum of 5 amperes at 120 volts ac and 0.5 ampere at 120 1743
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volts dc with a 10mV/ohm impedance ratio. Limit switches shall 1744
be National Acme Company, Heavy Duty, Snaplock Series D-2400X
(ST), mounted, with provisions for field adjustments. All alarm 1748
settings shall be adjustable over the full range of the measured
variable.

Pressure and temperature indicating switches for alarm 1750
shall have a maximum deadband of 2 percent of span.

RTDs and thermocouples shall be as follows: 1752

(a) The element of the RTDs, except those used for 1754
winding resistance detection, shall be platinum, 3-wire type,
100 ohms at 32F, and 0.22 ohm per deg F resistance change. The 1756
sheath material shall be Type 316 stainless steel for
temperatures up to 900F and Inconel for temperatures over 900F. 1757

(b) The element of the RTDs used for winding 1759
resistance temperature detection shall be copper, 3-wire type, 1760
10 ohms at 32F.

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ITEM 12 (c) The elements of the thermocouples shall be ISA
color coded, Type E, unless the thermocouple is
furnished wired to a thermocouple temperature
transmitter."

(d) Both RTDs and thermocouples shall have 1767
watertight connection heads connected to each thermocouple 1768
element if the element leads are not extended to a terminal
cabinet. The connection head shall be aluminum with a threaded 1769
gasketed cover and 3/4-inch conduit connection. A terminal 1770
strip with threaded fasteners shall be mounted inside the
connection head for connecting the element to thermocouple 1771
extension wires.

Supervisory instruments shall be Pently Nevada and 1773
shall be of the noncontacting type where possible. Provisions 1774
shall be made for mounting supervisory instruments on rotating
equipment in accordance with the instrument manufacturer's 1775
printed instructions. Digital read-outs shall have 8-segment 1776
elements, including decimal point, amber colored LED or planar
plasma gas, and visible from 15 feet under normal indoor 1777
lighting. The size shall be 1/2-inch minimum with an accuracy 1778
of ± 0.01 percent of full scale ± 1 digit and shall update 3 times 1779
per second, minimum.

Contacts for remote control and indicating lights for local control stations shall be furnished for status indication of motors, valves, dampers, and other final control elements. Indicating light elements shall be colored LED or neon lamps with colored lens, visible from 15 feet under normal indoor lighting. The color of the indicating lights shall be as follows:

- (a) Red: Equipment energized, such as motor running, valve open, or breaker closed.
- (b) Green: Equipment de-energized, such as motor stopped, valve closed, or breaker open.
- (c) White: Equipment abnormality, such as motor trip or breaker trip, except orange may be substituted for white for the burner management system.
- (d) Amber or Yellow: Equipment start permissive.
- (e) Blue: Equipment abnormality, operator initiated (no alarm condition)."

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23.3 Openings in Ducts and Furnace Walls: In addition to the instrument connections required in these specifications, the Contractor shall furnish 100 openings at locations designated by the Engineer for pressure and temperature instruments. Each of these openings shall consist of a Schedule 80 seamless carbon steel nipple, not less than 2-inch pipe size with a blind flange. The nipples shall extend 3 inches beyond the boiler insulation. The internal end of the nipple shall be smooth, free from burrs, and welded gastight and flush with the casing in areas not protected by water wall tubes. In areas protected by water wall tubes, the end of the nipple shall extend to the centerline of tubes and shall be protected by suitable refractory filling the space between the nipple and the tubes.

23.4 Thermocouples for Tube Temperature Monitoring and Windbox Fire Detection: The IPA shall furnish and attach thermocouples, furnish terminal cabinets located on one side of the boiler, and extend the thermocouple leads to the terminal cabinets in accordance with Contractor's instructions.

For tube temperature monitoring, the Contractor shall design the installation of 18 thermocouples in addition to one thermocouple for every 4 superheater tubes and one for every 4 reheater tubes leaving the furnace.

The Contractor shall provide the design and instructions for installing the thermocouples as follows:

- (1) Type, size, and location of thermocouple with installation instruments.

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(2) Methods adequate for shielding thermocouple junctions. 1822

(3) Location, type, and spacing of supports to prevent sagging or flexing and abrasion of the thermocouple leads. 1824
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23.5 Thermowells for Control and Test: The Contractor shall furnish and install control and test thermowells. The thermowells shall be made of the same material as the line in which they are installed. All test thermowells shall be accessible from outside the boiler. If thermowell extension necks are necessary, they shall be fabricated from straight lengths of 1/2-inch Schedule 40 pipe and shall terminate with a threaded pipe cap. 1828
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23.6 Connections for Pressure Instruments: The Contractor shall furnish and install all connections for pressure instruments. 1835

23.7 Flue Gas Sampling Point: Flanged 4-inch flue gas sampling ports shall be furnished with probes and their supports. The probes shall be as near the economizer exit as possible and shall sample each side of the boiler. The probes shall be of the dry type. The flue gas sampling point will be used for combustion control by CO or percent oxygen and shall be located by the Contractor. 1838
1839
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1841
1842

Thirty 4-inch flanged sampling ports shall be furnished with probes and their supports for air pollution sampling and for determining guaranteed excess air and air leakages. Five ports shall each be located at each side of the boiler economizer outlet, the air heater inlet, and the air heater outlet. The ports shall be located so that each duct is divided into 5 equal segments with a port in the center of each segment. 1844
1845
1846
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1849

23.8 Steam Sample Nozzles: All steam sample nozzles shall be furnished and installed by the Contractor in accordance with ASTM Standards. 1851

23.9 Sleeve Bearing FTD Coverings: Sleeve bearings on equipment furnished shall have provisions for FTD mountings. 1854

23.10 Oxygen and Carbon Monoxide Analyzer: The IFA will furnish and install the flue gas sampling system from the flue gas sampling probes including permanent recorders for a continuous check on excess air and carbon monoxide. 1857
1858

Added
PER C.O.
#3
ITEM 2(d)

"23.11 Furnace Flame Viewing Television System:

Each boiler unit shall be furnished with a Diamond Electronics closed circuit television flame viewing system designed as a complete package. Each system shall include four video cameras, camera mounting hardware, electric retract assemblies, control cabinets, compressed air cooling system accessories, remote video monitors with panel mounting hardware including hoods and panel bezels, interconnecting coaxial cables with connectors, and outline and installation drawings.

The video monitors shall be industrial grade, 9 inch diagonal, with all primary controls and adjustments front-mounted.

The flame viewing television systems will be utilized to monitor igniter oil flame during boiler warming and start-up operations. Once coal firing is established, it is anticipated the cameras will be retracted from the furnace to eliminate compressed air requirements for the camera and lens tubes.

The electric retract assembly and control cabinet shall include all necessary equipment to automatically retract the camera from the furnace in the event of high camera temperature or loss of cooling air. Facilities shall also be provided on the control cabinet for local control of insertion and retraction. A handwheel shall be furnished on the electric motor drive for manual operation. Retraction of the camera shall automatically shut off the cooling air and de-energize the camera. Insertion of the camera shall automatically open the cooling air valve and energize the camera. Insertion of the camera shall be inhibited in the event of high camera temperature or low compressed air supply pressure, and a contact shall be provided for connection to the IPA-furnished annunciator system.

The IPA will provide a compressed air supply of up to 52 scfm at a pressure varying from 60 to 125 psi near each camera for cooling of the lens tube and camera housing when the camera is in use.

(CONTINUED)
G3-56

G3-56 (a)

CC#3
Item 2(b)

The IPA will furnish and install a 120 volt ac supply to each camera control cabinet and interconnecting wiring between terminals on each electric retract assembly and control cabinet (if remote mounted).

The IPA will install the Contractor-furnished coaxial cables from each camera to its remote video monitor, and will install the video monitors and panel mounting hardware. The panel mounting hardware shall be a dual rack version.

The Contractor shall furnish and install all filters, regulators, automatic shut-off valves, piping, and other accessories required for a complete installation from the compressed air supply terminal points.

The Contractor shall install onto the furnace wall each electric retract assembly, camera, cooling system accessories, and all other components, including supports. All electrical components shall be wired to terminals in a NEMA 12 junction box for connection by the IPA.

Each coaxial cable shall be 500 feet in length and a unit adjusting price shall be stated in the proposal to adjust the lump sum price after exact lengths are determined."

G3-54(b)

24. Pipe Hangers: All pipe hanger and supports shall be in accordance with Manufacturer's Standardization Society SP-58 and the following: 1861

"(a) Variable spring hangers shall be Grinnell Type B-268. The use of Grinnell Type 82 variable spring hangers will be permitted in confined areas where thermal movement of the piping is relatively small provided prior approval of the Engineer has been obtained. The use of Grinnell Type 98 variable spring hangers will be permitted where the thermal movement of the piping exceeds the capabilities of the Type B-268 hanger provided prior approval of the Engineer has been obtained." 1862

(b) Constant support hangers shall be Grinnell Model R. 1866

25. Structural Steel and Miscellaneous Small Collecting Steel Supports: 1868

25.1 Structural Steel: Boiler suspension steel shall be furnished for attachment to the IPA structural steel frame. The suspension steel furnished shall include all structural steel members from which the boiler hangers are directly suspended. The members shall be complete and ready for bolting to the IPA structural steel frame. All other equipment furnished by the Contractor shall be self-supporting. 1871
1872
1873
1874

The Contractor shall design and furnish the seismic ties connecting the boiler, air heaters, flue gas ducts, hot air ducts, and all appurtenances to the IPA structural steel frame, including the attachment assemblies to be added to the frame members in order to prevent local overstressing at the connections. 1876
1877
1878

(a) The maximum allowable deflections of beams and girders supporting vertical loads shall not exceed 1/360 of the span. The maximum allowable deflection of buckstays and other structural members resisting lateral loads shall not exceed 1/360 of the span due to seismic forces or the pressures in the boiler, whichever is the greater. Lateral drift shall be limited to the provision specified in the Uniform Building Code. 1880
1881
1882
1883
1884

(b) The boiler bracing system shall be so arranged that lateral forces are transferred to the main structural frame by more than one path. 1886
1887

(c) Welding of splices in main girders associated with boiler support steel shall be in accordance with the American Welding Society Standard Specification for Welded Highway and Railway Bridges. Other structural welding shall be in accordance with the American Welding Society D1.1-79. Field welding of connections shall not be done, unless specifically shown on the drawings and approved by IPA. 1889
1890
1891
1892

G3-57

- (d) Structural steel shapes, tubing, and plates shall be fabricated from ASTM A 36 steel. Plate girders shall be fabricated from ASTM A 36 or ASTM A 516, Grade 65, or other steel approved by the Engineer as suitable for the intended service. 1894
1895
1896
- Only steel for which mill test reports are available and on which heat numbers are clearly marked shall be used. Should the Contractor request the Engineer to approve the use of stock material from the fabricator's supply, the material proposed to be used shall be analyzed and tested as provided for new steel. The cost of the analyzing and testing shall be borne by the Contractor. 1899
1899
1900
1901
1902
- (e) Structural bolted joints shall be in accordance with Specification for Structural Joints Using ASTM A 325 Bolts, as shown in the Seventh Edition of the Manual of Steel Construction of the American Institute of Steel Construction. 1904
1905
1906
- (1) Connections subject to stress reversal shall be friction type. 1909
- (2) Other types of connections may be bearing type connections and bolt threads may be included in the shear plane. 1910
1911
- (3) Minimum bolt diameter for structural bolted connections shall be 1 inch." C.D. 2
Item 20
- (f) The approval of the Engineer shall be obtained before any steel work is shop-detailed or fabricated. 1913
1914
- The IPA will furnish and install the following structural steel: 1916
- (a) Structural steel frame to support the boiler suspension steel. 1918
- (b) Air heater supporting structure. 1920
- (c) The platforms, walkways, and ladders around the Boiler Unit for operation and maintenance. 1922
- (d) The beams from which the flue gas and hot air ducts are supported. 1924
- (e) All required boiler auxiliary equipment foundations and anchor bolts. 1926

"25.1.1 Boiler Grating Supports. Furnish the required boiler grating supports at the locations indicated as follows. The grating, handrail, and kickplate will be furnished and installed by the IPA.

(a) Top of front and rear wall wind boxes.

(b) Top of buckstays as follows:

- (i) Front wall at Elevations 4815'-3", 4829'-3", and 4841'-3", plus partial at Elevations 4853'-6", 4873'-9", and 4890'-0" (at observation doors).
- (ii) Rear wall at Elevations 4815'-3", 4829'-3", 4841'-3", and 4853'-6".
- (iii) Side walls at Elevations 4815'-3", 4829'-3", 4841'-3", and 4799'-6", plus partial at Elevation 4853'-6" (from furnace rear wall to 6'-0" forward of scaffold door center line)."

"In addition, the Contractor shall furnish and erect supports for a separate platform for each of 14 observation doors located on the furnace sidewalls at approximate Elevation 4884'-6" and for each of four maintenance doors located on the horizontal convection pass sidewalls at Elevation 4898'-0". The platform supports shall straddle the soot blower housing below each door and shall be attached to a buckstay beneath the soot blower. The grating, handrail, kickplate, and ladders will be furnished and installed by the IPA."

8. "25.1.2 Economizer Outlet Flue Grating Supports. Furnish the required economizer outlet flue grating supports at the locations indicated as follows. The grating, handrail, and kickplate will be furnished and installed by the IPA:

(a) On the economizer hopper casing at the convection pass front wall.

(b) On the flue to the air heaters at the convection pass rear wall.

"25.1.3 Air Heater Outlet Duct Test Port Access Platform Grating Supports. Furnish and erect the required grating supports atop the flue from the air heater gas outlets to the fabric filter inlets. The grating, handrail, kickplate, and stair stringers and treads will be furnished and installed by the IPA."

25.2 Miscellaneous Small Collecting Steel Supports:
If the Option to Furnish Boiler Units Without Miscellaneous

1928
1929

G3-58(a)

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114. Response #10 of 17 of Appendix B.

IP10_001332

Small Collecting Steel Supports is exercised, the IPA will furnish all structural steel members from which the boiler hangers are directly suspended.

1930

25.3 Mechanical Shock Suppressors. Furnish the required mechanical shock suppressors at the locations indicated as follows.

C.O. #2
Item 9

<u>Number Required</u>	<u>Description</u>
8*	Side-to-side ties on convection pass front wall (mechanical shock suppressors in lieu of link ties)
8**	Side-to-side ties on convection pass rear wall (mechanical suppressors in lieu of link ties)
18**	Side-to-side and fore-and-aft supports on coal piping
24**	Fore-and-aft and side-to-side supports on shell downcomers
22**	Fore-and-aft and side-to-side supports on end downcomers
4**	Fore-and-aft ties on the steam drum
8**	Fore-and-aft and side-to-side supports on partial bypass system piping
2**	Side-to-side supports on economizer discharge line

94 Total

The mechanical shock suppressors are as manufactured by Pacific Scientific Company and are as follows.

<u>Number Required</u>	<u>Model</u>
20	PSA-100
10	PSA-35
48	PSA-10
12	PSA-3
4	PSA-1

94 Total"

G 3-58 (2)

26. Painting and Protective Coatings: All structural steel and miscellaneous iron and steel shall be prepared and prime painted as follows: 1933

26.1 Surface Preparation: 1935

(a) All steel surfaces shall be abrasive blast cleaned in accordance with Steel Structures Painting Council Specifications No. 6 Commercial Blast Cleaning. 1937
1938

(b) The abrasive material shall be a choice of silica sand, flint, steel shot or steel grit. The abrasive material shall be graded to produce a surface profile ranging between 1.5 mils, minimum, to 2.5 mils, maximum. 1940
1941
1942

(c) Steel shot or grit shall not be reused unless properly cleaned between cycles to remove oily contaminants, dust, dirt, rust, mill scale, oxides, and corrosion matter. 1944
1945

(d) All fallout and residue deposited on the cleaned steel surfaces from blast cleaning operations shall be removed by vacuuming or with clean compressed air. 1947
1948

(e) Prior to blast cleaning, with the exception of rolled edges of structural shapes, all corners and rough or sharp edges of structural and miscellaneous steel shall be ground to a minimum 1/32-inch radius. Rough welds shall be ground smooth and weld spatter removed. 1950
1951
1952

(f) All rivet heads, bolt heads, exposed threaded portions of bolts, nuts, and washers shall be cleaned to remove rust, scale, dirt, dust, and oily or waxy substances prior to shop or field painting. 1954
1955

26.2 Paint Material and Application: All exposed steel surfaces shall be prime painted as follows: 1956

(a) The primer material shall be solvent-based inorganic zinc, Ameron, Protective Coatings Division, Dimetocote 6. 1960
1961

(b) The specified material shall be applied in accordance with the manufacturer's printed instructions. The applied dry film shall be 2.5 mils, minimum, and 5.0 mils, maximum. The prime coat shall be applied as soon as practicable 1963
1964
1965

after completion of the cleaning work, preferably within 8 hours but in any event prior to any deterioration of the prepared surfaces. Any recontamination of the cleaned surfaces shall be recleaned by spot blast cleaning.

(c) The applied coating shall be free of skips, holidays, thin spots, runs, sags, and mud-checking. The use of thinners for any reason shall be limited to the type and amount specified by the manufacturer but shall not relieve the Contractor from obtaining the required coverage.

(d) The specified material shall be delivered to the plant site in the original sealed containers, bearing the manufacturer's name, product designation, batch number, and complete directions for use.

(e) Subassemblies and areas difficult to paint or which would be inaccessible for painting after assembly or erection shall be painted prior to assembly or erection.

(f) Any damage to the prime coated surfaces resulting from, but not limited to, erection problems, field welding, field drilling, or cutting shall be repaired with the material specified as the prime coat and in accordance with the manufacturer's printed instructions. Any substitute materials for the touch-up of the prime coating shall be subject to the written approval of the Engineer. Touch-up work of the damaged prime coated areas shall not be performed until such areas have been prepared to remove all foreign contaminants including, but not limited to, weld spatter, flux, oxides, fume condensates, and charred paint.

If erection is by others, the Contractor's liability for damage to the prime coat on the surfaces is terminated upon arrival of the material at the jobsite. If field changes are initiated or caused by the Contractor and these changes cause damage to the prime coating, the Contractor shall perform any required touch-up work.

With the exception of touch-up painting on materials supplied by the Contractor which was omitted to facilitate erection or which was scratched, burned or damaged during shipment or installation, all field painting will be performed by the IPA's painting contractor.

27. Valves and Closure Devices: The Contractor shall furnish and deliver all valves on connections which require closure for hydrostatic testing of pressure parts, exclusive of each superheater outlet, economizer inlet, and reheater inlet and outlet.

The valves furnished by the Contractor shall include, 2002
but not be limited to, the following:

- C.O.#2
Item 18
- "(a) All safety valves. These safety valves shall be connected to Contractor-furnished equipment, exclusive of the superheater outlet and reheater inlet and outlet safety valves, and shall be provided with "gags,"
- CHANGED BY C.O.#11 R-1
ITEM 14
- (b) Electromatic relief valve or equivalent. 2007
- (c) Motor-operated stop valve for electromatic relief valve. 2009
- (d) Auxiliary steam stop valve. 2011
- C.O.#11
R-1 Item 11(e)
- "(e) Two full capacity spray control valves, two check valves two air-operated block valves, two upstream and two downstream isolating valves for each spray type desuperheater. The control valves shall be as manufactured by Fisher Controls Company, the check valves shall be as manufactured by Crane Company, and the block and isolating valves shall be as manufactured by Dresser."
- (f) All blowoff valves. 2016
- (g) All blowdown valves, including not less than one motor-operated blowdown valve. 2018

(h) Two shutoff valves for each of the following connections: 2023

(1) Acid cleaning connections shall be equipped with a Anchor/Darling closure. 2022

(2) Sample nozzles. 2024

(3) Water samples. 2026

(4) Pressure points. 2028

(5) Nitrogen blanketing. 2030

C.O.#3
Item 1c

"(6) Scrubber reheater soot blowing steam supply."

The isolation valves for the scrubber reheater soot blower shall be as follows.

Equipment Data

1-3 inch
Crane 787-U7

Special Class, Manual

1-3 inch
Crane 787-U7

Special Class, with Limitorque
SMC-03-15 operator

787-U7

Class 1500A217 GR WC6
1-1/4 per cent Chrom 1/2 per
cent moly alloy steel pres-
sure seal bonnet gage valve,
cobalt-based hard-faced seating
surfaces, flexible wedge disc,
butt-welded ends.

(i) One manual shutoff valve and one motor-operated shutoff valve for each vent or drain required for start-up or shut-down. Boiler vents and drains not required for start-up or shut-down shall have 2 manual shutoff valves. 2032
2033
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(j) One stop valve and one check valve for the feedwater inlet. Each valve shall be suitable for the Boiler Unit hydrostatic test and IPA feedwater system hydrostatic test. 2036
2037
2038

pressure at 5,000 psig, without requiring special blanking fixtures or other protective devices. 2039

C.O. #113
R-7 Item 13
"The upstream end of the stop valve shall be provided with a double-valve drain connection."

The minimum valve size shall be one inch. Valves with body sizes 2 inches or smaller shall be furnished with socket welding ends. Valves with body sizes 2-1/2 inches or larger shall be furnished with butt welding ends for backing rings and with stellited seating surfaces. 2046
2047
2048

Valves that are required to be operated automatically or remote-manually by control signals shall be considered as control valves. Each control valve for throttling service shall be equipped with either a pneumatic cam-type valve positioner for air diaphragm and air piston operator type valves or with a valve positioner for hydraulic or electric motor operator type valves. 2050
2051
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Water and steam control valves shall be outside stem and yoke with bolted gland and stellite trim. Water control valves shall have bolted bonnets and shall be sized for a maximum pressure drop of 50 psi and 90 percent open at the designed flow rate. 2056
2058
2059

Hydraulic and pneumatic operators shall be provided with a positioner, a locally operated 3-way manual valve, or a 3-way solenoid valve for remote control, and limit switches to indicate open and closed positions. Solenoid actuators shall be of the epoxy encapsulated, continuous duty type, mounted in weatherproof enclosures. 2061
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Per C.O. #3 Item 14
"All boiler trim valves 4 inches or larger, and all other valves 2-1/2 inches or larger rated ANSI Class 900 or above, shall be as manufactured by Crane Company, unless approved otherwise by the Engineer. These valves shall have the following features."

(a) All gate, globe, and check valves shall have a pressure seal or breach lock bonnet joint. 2070

(b) All gate valves shall be OS&Y type with flexible wedges. 2072

(c) All globe valves shall be CS&Y type with guided discs. 2074

(d) All check valves shall be tilting disc type. 2076

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114. Response #10 of 17 of Appendix B.

(e) All hand-operated valves shall have hammer
low handwheels or gear operators. 2078

Per C.D.
3 Item
14

"All boiler trim valves 3 inches or smaller,
and all other valves 2 inches or smaller shall
meet the following requirements."

(a) All hand-operated valves rated ANSI Class 1500 2082
and above shall be Yarway Corporation Weldbond and shall be Y 2083
pattern globe valves with stellite faced seating surfaces.

(b) All check valves shall be Yarway Corporation 2085
Weldbond and shall be spring loaded piston type with stellite 2086
seating surfaces.

All safety valves shall be Dresser Industries, 2088
Incorporated, Consolidated safety valves.

28. Valve Motor Operators: ~~Each motor operator shall~~ 2091

R-1 COM#11
Item 2a

"Motor operators shall be furnished with local push-button
control station with 'Open' and 'Close' momentary contact
push-buttons and three indicating lights."

Motor operators shall be furnished with local push-button 2092
control station with "Open" and "Close" momentary contact push 2093
buttons and 3 indicating lights. Each motor operator shall be 2094
provided with a disconnect clutch to allow hand operation of the
valve. The handwheel shall be automatically disengaged when the 2095
motor is energized. The IPA will furnish a remote control 2096
station, remote indicating lights, and a reversing motor starter
for each valve operator and will connect the power and control 2097
wiring of the operator to the remotely located equipment.

The motor operator shall be capable of opening and 2099
closing the valve against the rated pressure. The motor 2100
operator, gearing, and shaft shall be designed to provide not
less than 150 percent of the torque requirements required to 2101
open and close the valve against rated pressure.

The motor shall open or close the valve in not more 2103
than 60 seconds.

R-1 COM#11
Item 2(b)

"The motor control shall be designed for remote operation." 2105

Motor operation of the valve shall be 2106
designed for control from a "Close-Open" selector type control
station such that the motor will operate automatically by 2107
maintained contact, will automatically stop at the limits of
travel, or will stop at any position by release of the 2108
maintained contacts. The valve shall be capable of being 2109
operated in either direction, open or close, when it is in an
intermediate stopped position.

Reduction gearing shall be totally enclosed in an atmospheric watertight housing and shall operate in a lubricant. Motor leads shall be brought out to a weatherproof terminal box to which the supply conduit may be connected. The auxiliary switches shall be of the rotary drum type. There shall be 4 rotary drum switches, each having 4 contacts, and each drum switch shall be independently adjustable. Two rotary drums of 4 switches each shall be wired to provide control and indication of the limits of total valve travel. The remaining 2 rotary drums of 4 switches each will be used by the IPP in interlock and control circuits, and these switches shall be independently adjustable to open or close at any position of valve travel. The switch contacts shall be silver to silver, of the quick-break type, and shall be rated at 10 amperes at 120 volts ac.

Double torque switches shall be provided equipped with normally closed contacts which open when a value of torque is reached exceeding the switch setting and which remain open until the operator is reactivated in the opposite direction.

All indicating light and control circuits shall be designed to operate from a 120-volt a-c single-phase, 60-hertz power source. ~~Indicating lamps shall be rated 6 volts and shall be furnished with transformers designed to operate from a 120-volt a-c source.~~ (PER COM R-1 Item 2 (c))

The valve operator shall be completely wired, and all wiring shall be brought out to numbered terminals to which the remote control and indication circuits may be connected. Terminal strips shall be equipped with screw type terminals of adequate size to accommodate No. 12 AWG wire and shall be Westinghouse Type 542246 or Jones Series 141. All wiring outlets shall have openings to receive conduit of ample size to permit wiring of the equipment with the required number of No. 12 AWG 600-volt synthetic insulated wires.

All electrical control equipment including, but not limited to, switches, terminal strips, and associated wiring shall be housed in NEMA Type 4 watertight enclosure. This enclosure shall be an integral part of the valve operator assembly and shall be arranged to provide easy access to equipment for working and maintenance.

A thermostatically operated space heater shall be provided in the control enclosure to minimize moisture condensation. The space heater shall operate from 120 volts ac and shall be wired to the terminal block, independent of the control circuits.

29. Electric Motors:

2142

29.1 Service Conditions: All electric motors shall operate at their specified rating at the ambient temperatures and altitudes indicated in Article 1 of this Division. Motors located outdoors will be subject to ambient corrosive conditions of fog, rain, snow, 100 percent relative humidity, coal dust, fly ash, severe wind, dust, and sand storms. Motors located indoors will be subject to mild corrosive conditions of water vapor, dust, high humidity, coal dust, and wash downs.

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29.2 Ratings: All a-c electric motors shall be suitable for operation on a 60-hertz power supply. A-c motors rated 1/3 horsepower and above shall be 3-phase.

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29.2.1 Horsepower: The motor horsepower rating shall equal or exceed the maximum brake horsepower required by the driven equipment when the driven equipment is operating at the design load condition. Service factor shall not be utilized to meet this requirement.

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The motor horsepower rating shall meet the maximum requirement of the driven equipment without exceeding the insulation temperature rating at the service conditions. Service factor may be utilized to meet this requirement.

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29.2.2 Voltage: A-c motors rated above 300 horsepower shall have a voltage rating of 6,600 volts. Motors rated 300 horsepower and below shall be rated at 460 volts except that motors rated less than 1/3 horsepower shall be rated 115 volts, single-phase. E-c motors shall be rated 125 volts.

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29.2.3 Temperature Rise: The temperature rise of the motor, when measured by the resistance method and when operating at rated load continuous duty conditions in a 40C ambient, shall not exceed 80C.

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29.2.4 Construction: All motor stator windings shall be copper. All 6.6 kV motor rotor windings shall be copper.

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29.3 Starting Characteristics: ~~Change the first sentence in the article to read:~~ "All motors shall be designed for 110 per cent rated voltage across-the-line starting and... shall be capable of accelerating the driven equipment from standstill to rated speed with 85% of the rated voltage applied to the motor terminals. Replace the second sentence with:

"For motors rated above 200 horsepower, the torques in per cent of full load torque at rated voltage and frequency shall be not less than 200 breakdown, 85 pull-up, and 100 starting. Locked rotor kVA/hp at rated voltage and frequency shall not exceed 5.77 for motors rated above 200 through 500 horsepower and 5.59 for motors rated above 500 horsepower."

or 150 percent for d-c motors. Motors used for remote burner operation shall be capable of providing a minimum of 2 times

2191

full-load horsepower required by the driven device when it is new. "IN ADDITION PULVERIZER MOTORS SHALL BE SIZED TO START A FULLY LOADED PULVERIZER."

2192
C.O.#2

29.4 Running Characteristics: After the motors have operated at rated horsepower output, speed, and voltage sufficiently long enough to have reached normal operating temperature, the motors shall withstand, without damage or loss of life, the effects of an occasional automatic transfer from the normal to reserve power source with (1) a "bus dead" time of 5 cycles and with (2) a maximum "bus dead" time of 50 cycles. The transfer to the reserve source will be initiated by IPA equipment when the motor bus residual voltage drops to approximately 50 percent of rated voltage.

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29.5 Insulation System: All material used in the coil insulation system including ground insulation and turn-to-turn, coil end-turn, and binding taping shall be Class B material or materials with a temperature rating equal to or greater than Class B materials. The individual coils of the wound stator shall be processed so that the insulation becomes a dense homogeneous mass, free of voids. Coils shall be gaged to fit the slots tightly, and the insulating materials used shall be such that the insulation will not shrink with resultant loosening of the coils in the slots. If multi-turn coils are used, the insulation system shall be designed to ensure high turn-to-turn insulation levels. The entire insulation system including all coil connections and leads shall be completely sealed to protect the motor from dust, moisture, and other contaminants. Random wound motor winding shall be completely encapsulated. "All insulated windings shall have Class B nonhygroscopic insulation systems rated for temperature rise and ambient temperature in accordance with NEMA MG 1 standards for the insulation class specified."

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Where motors with Class B insulation are not available, motors may be furnished with Class F insulation provided the temperature rise is in accordance with NEMA MG 1 values for Class B insulation and provided all other requirements are as specified, including bearing life and sealed insulation. A sealed insulation system is defined as two additional dips and bakes of epoxy varnish or vacuum-pressure impregnation shall be included to provide a premium insulation for random windings. Sealed insulation for formed coil windings shall be in accordance with the requirements of NEMA MG 1 standards."

C.O.#2

29.6 Enclosure: Motors rated 6.6 kV installed indoors shall be open drip-proof except that the pulverizer motors shall be totally enclosed, tube cooled."

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Those motors installed outdoors shall be weather-protected, Type II. Motors rated 460 volts shall be open drip-proof except that motors rated 50 horsepower or below shall be totally enclosed and fan cooled.

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- mech

Cabcock & Wilcox

a McDermott company

16-09.05
11-0010
Power Generation

20 S. Van Buren Avenue
P.O. Box 351
Barberton, Ohio 44203
(216) 753-4511

October 7, 1983

Black & Veatch
Consulting Engineers
P.O. Box 8405
Kansas City, MO 64114

Attn: Mr. Roger Dutton

Re: Intermountain Power Project
Specification 2010
B&V Ref: 9255.62.3401
B&W Ref: RB-614/615
Subject: Sleeve Bearing
Thermocouple
Corres. No.: BV-0385

Gentlemen:

Pursuant to a phone conversation with Mark Chapin on 9/23/83, regarding Change Order 003, Page 7, Item 3, Division G3, Article 29.8, last sentence, B&W proposes to clarify the sleeve bearing thermocouple to read as follows:

"A .433" diameter bearing thermocouple hole will be drilled so that the centerline of the bearing thermocouple tip will be .393" below the O.D. of the babbit surface. This will provide a distance of .300" from the O.D. of the babbit surface to the edge of the thermocouple tip".

A sketch "RENK 14-140" is attached to picture the thermocouple location.

Very truly yours,

R.B. Rizer

R.B. Rizer, Project Engineer
UPGD Project Management

RBR:nk

cc: JS Laing
MD McCoy
DW Fowler
WK Carson
RC Miller
RJ Clark

BHB / 10/12/83
AA / fyi

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OCT 11 1983

REC'D BECHTEL POWER
CORPORATION - IPP_{0843k}

23.7 Filters: Motors rated 300 horsepower and above shall be equipped with air filters installed in the air inlet openings of each motor. The filters shall be filterglass type, Owens-Corning, Roto-Aire or American Air Filter Company. The ventilating system shall be designed to limit the temperature rise of the motors to NEMA limits at rated load when the resistance to air flow is twice that for a clean filter. 2222 2224 2225 2226

23.8 Bearings: ~~Bearings for horizontal motors rated~~ 2229

C.O.#2
ITEM 2

"Bearings for all horizontal drip-proof motors above NEMA 320 series frame size or for TEFC motors above NEMA 440 series frame size shall be sleeve type and sealed to prevent the leakage of oil and the entrance of water or dirt."

Means shall be provided for preventing creepage of lubricants 2231

along the shaft. Oil level sight gauges and means for adding and draining oil shall be provided. Bearings and bearing brackets shall be of the split type to permit inspection and replacement without uncoupling the motor. Bearings shall be insulated, or other equivalent means shall be provided to prevent the passage of shaft currents through them. 2232 2233 2235 2236

"Sleeve bearings shall be provided with thermocouples for bearing temperature detection. Thermocouples shall be in accordance with Subarticle 23.2.2 of this division except as specified herein. Thermocouples shall be ungrounded and shall be insulated with magnesium oxide packed in a stainless steel protective sheath. The thermocouple temperature sensitive tip shall be hermetically sealed. Each thermocouple tip shall be held in intimate contact with the outside diameter of the bearing babbitt not more than 1/8 inch from the shaft surface of the bearing."

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B&W CLARIFICATION LETTER
BV-0385 of 11/7/83, SEE
OPPOSITE PAGE

"Grease or oil-lubricated antifriction radial and thrust bearings where furnished shall be regreaseable and designed and fabricated in accordance with AFBMA standards to have a minimum L-10 rating life of not less than 130,000 hours under the load, speed, and thrust requirements for direct coupled service and not less than 42,500 hours for belt or chain connected service. Grease-lubricated radial bearings shall be double-shielded."

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~~Lubricant is added. Oil lubricated ball bearings shall be provided with reservoirs, means for adding and draining oil, and oil level sight gauges. Unless otherwise specified, all ball bearings shall have a minimum rating life of 100,000 hours as calculated by the Anti-Friction Bearing Manufacturer's Association's Standard Method of Evaluating Load Ratings of Annular Ball Bearings, as last revised. All ball bearings shall be provided with seals to prevent the leakage of lubricant and the entrance of dirt or water along the shaft.~~ 2246 2248 2249 2251 2252

Wherever operating speed and loadings permit, vertical motors shall be equipped with an oil lubricated ball thrust bearing located in the upper end shield and an oil or grease lubricated guide bearing at the lower end of the shaft. The bearing system shall be capable of taking thrust in both the upward and downward directions and withstanding all loads imposed by the pump and motor rotor. If the combined pump and motor thrust is such that a single ball thrust bearing will not provide the bearing life specified herein, the thrust bearing shall consist of 2 or more angular contact ball bearings in tandem. The bearing system shall be designed to limit upward movement of the rotating parts to prevent damaging shock and impact loading of the thrust bearings.

"29.8.1 Core Construction. Fabricated aluminum core construction of the pulverizer motors is not acceptable."

C.O.#2

29.9 Magnetic Center: Each rotor shaft shall be marked before leaving the factory to indicate the free running magnetic center in a manner that can be positively and readily identified for use in making proper alignment.

"For horizontal sleeve bearing motors, the rotor end float and coupling end play shall be in accordance with NEMA MG 1-20.81. For each bearing, the difference between the magnetic center and the total end float shall not exceed ± 12 per cent of the total end float when the motor is level and running at no-load with rated voltage and frequency applied."

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29.10 Noise: If the motor complies with the following requirements, the IPA will be responsible for OSHA

compliance. The octave-band levels shown below shall be used to limit the maximum amount of noise that shall be produced by a motor, except for a motor rated below 1,000 horsepower, the noise level shall not exceed 87 dB in the 20-75 and 75-150 ranges. If octave-band analyses are not available, then the average overall sound pressure level of the motor noise shall be limited to 85 dB (C Scale - flat response).

<u>Limiting Octave Levels for Equipment Noise</u>		2277
<u>Octave Bands</u>	<u>Average Octave Levels</u>	2278
<u>(Frequency-Hz)</u>	<u>(dB re 0.0002 Dynes/Sq Cm)</u>	2279
20-75	96	2281
75-150	90	2283
150-300	87	2285
300-600	85	2287
600-1,200	85	2289
1,200-2,400	85	2291
2,400-4,800	85	2293
4,800-9,600	85	2295

The octave levels given in the above table are in terms of dB re 0.0002 dynes/sq cm. The average of the levels measured at the several measurement points around the equipment shall be used for comparison with the specified levels. The average octave levels shall be determined on a power basis as stated in Paragraph 7.1.3. of IEEE No. 85 and not on an arithmetic basis.

The octave levels shall be measured at points located on an imaginary hemisphere that completely encloses the equipment to be tested; and in reporting the test results, the radius of the hemisphere and the constant for converting the average sound pressure level to sound power level in dB re 10^{-12} dB shall be given.

Meters used shall be in accordance with ANSI Z and ANSI S1.6, both as last revised.

29.11 Corrosion Protection:

29.11.1 Painting: All unfinished interior surfaces of the motor enclosure shall be cleaned to remove scale and foreign material, primed, and painted with an oil resistant, rust-inhibiting paint. 2314 2315

29.11.2 Varnishing: The stator core shall be protected from corrosion by not less than 2 coats of oil and weather-resistant varnish. 2319

29.11.3 Other Treatments: All other exposed internal metal surfaces including, but not limited to, the rotor and shaft shall be given a durable corrosion resistant coating. All hardware, both internal and external, shall be of noncorrodible materials or shall be treated to resist corrosion. 2321 2323 2324

29.12 Accessories: Motors shall be furnished with the following accessories: 2327

"Article 29.12.1 Surge Protection.

Remove all Surge Protection for 6,600-volt
MOTORS, PER CODE 1 Item 4 (Edwards)
Item 6 (P.4 FANS) \$2,514.00 (EPA)

C.O.#2

29.12.2 Winding Resistance Temperature Detectors 2334
(RTDs): Motors rated 300 horsepower and above shall have 6 RTDs provided in the slot portion of the core. 2335

29.12.3 Terminal Boxes: Motor leads shall be brought out to a weatherproof terminal box to which the supply conduit may be connected. The terminal box shall be designed for connection of a conduit to the top, bottom, or either side. The terminal box on horizontal motors shall be located as shown in Assembly F-1 of NEMA Standard MG1, unless otherwise specified. The lead entrance into the motor frame shall be sealed against moisture. 2338 2339 2340 2341 2342

"Terminal boxes on all motors shall be at least one size larger than normally furnished as standard. All motor power lead terminal boxes on 6,600-volt motors shall be large enough to provide working space for field fabrication or stress cones within the housing and to contain the stress cones after fabrication and in any event shall provide not less than 12 inches of space below the connectors."

C.O.#2

Motors rated 1,500 horsepower and above shall be provided with adequately supported and readily untolted line terminal connections. Removal and reapplication of taped insulation shall not be required to isolate and test individual phases of the motors. Separate terminal boxes shall be produced for power leads and surge protection for motor heater leads and current transformer leads. 2347 2348 2349 2350 2351

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

For motors that the Contractor furnishes, the Contractor shall furnish waterproof terminal boxes and shall connect the secondary leads of motor current transformers and the supply leads of motor electric space heaters to terminal strips in the terminal boxes.

29.12.4 Current Transformers: Current transformers having relay accuracy classification of C100 shall be installed in the neutral end of each phase of the stator winding of motors rated 1,500 horsepower and above. Standard ratios shall be selected such that with rated load in the motor, including any service factor, secondary current will be 5 amperes or less. The transformers shall be enclosed and shall be readily accessible.

29.12.5 Electric Space Heaters: Electric space heaters shall be provided on all motors of 10 horsepower or larger to prevent the condensation of moisture on the motor interior when the motor is not in operation. Heaters shall be securely fastened to the motor frame and insulated therefrom. The heaters shall be designed to operate from a 120/240-volt, single-phase, a-c source. The space heaters shall be readily accessible for inspection, maintenance, and removal without disconnecting the motor or moving the motor from its operating position.

29.12.6 Lifting Devices: Lifting devices shall be provided to aid in the installation and removal of the motors.

29.12.7 Grounding Pads: Each motor shall be provided with a suitable grounding pad with tapped holes, matching bolts, and cable lugs.

30. Emissions: The Boiler Unit shall incorporate the best available technology applicable to the boiler being offered and shall be designed to minimize air pollution emissions without causing Boiler Unit operating problems including tube wastage, ash slagging, ash fouling, and boiler vibrations. Air pollution emissions to be minimized shall include nitrogen oxides, sulfur oxides, carbon monoxide, hydrocarbons, unburned carbon, and particulates.

Each Boiler Unit shall not cause nitrogen oxides (expressed as nitrogen dioxide) to be discharged into the atmosphere at a rate exceeding 0.55 pound per million Btu heat input. NOx emissions shall be determined in accordance with applicable provisions of 40 CFR60 Subpart D.

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Spec. 2010N
Revised May 29, 1981
DETAILED REQUIREMENTS FOR ITEM 1

The nitrogen oxides emission limitations shall be 2389
applicable throughout the load range for all the specified coals 2390
and for all combinations of pulverizers in operation.

The Contractor shall provide all necessary changes to 2392
the Boiler Unit at his own expense, which may be required to 2393
obtain approval of NOx emission levels by the cognizant
regulatory agencies on the effective date of the contract. 2394

<u>PART G - DETAILED SPECIFICATIONS</u>	15
<u>DIVISION G4 - AVAILABILITY IMPROVEMENT PROGRAM</u>	17
1. <u>General</u> : The Contractor shall, at no cost to the IPA, participate in an Availability Improvement Program (AIP) to ensure that the Boiler Units provided will achieve maximum availability and will recommend any improved design features identified during design, fabrication, or erection. This program shall continue until the expiration of the unit guarantee period.	21 22 24
2. <u>Availability Program Coordinator</u> : The Contractor shall assign an experienced individual to the Intermountain Power Project with principal responsibility to act as the Contractor's Availability Program Coordinator (APC). The APC shall have no other responsibilities which would hamper the goals of the Availability Improvement Program. The resume of the selected APC shall be submitted to the Project Director for approval.	27 28 29 30
The APC shall represent the Contractor at the AIP Task Force meetings. The APC shall be supported by other personnel including the Contractor's Project Manager, Manager of Quality Assurance, Manager of Field Services, Manager of Engineering and additional personnel as required. The APC shall have free access to all Contractor's personnel as necessary to accomplish the goals of the AIP. The APC shall report periodically to the Contractor's Senior Vice President of Fossil Power and Construction.	32 33 34 35 37
3. <u>Availability Improvement Program Task Force</u> : The Task Force shall be comprised of the Contractor's Availability Program Coordinator and designated representatives of the Project Manager. The Task Force shall meet on a regular basis during all phases of the project as described in Article 5 of this Division.	40 41 42
4. <u>Reference Plants</u> : This program shall use as a basis, at least 6 preselected reference plants which shall consist of large pulverized coal-fired units. Each reference plant shall be defined as all the Contractor's boilers designed for and installed at the same station whether furnished under the same or separate contracts. These reference plants shall be selected by the Project Manager in cooperation with the Contractor.	45 46 47 48
5. <u>Actions to be Taken by the AIP Task Force</u> :	50

5.1 Design Phase of the Project: During the design phase of the project, the following actions shall be taken by the AIP Task Force: 53

(a) An initial meeting shall be held approximately 24 weeks after effective date of the contract to conduct a detailed review of the reference units with discussion of each outage to date and comparison of the design of those units with the IPP boilers. 55 56 57

(b) A follow-up meeting to the initial meeting shall be held approximately 29 weeks after effective date of the contract to discuss what design changes, if required, shall be incorporated in the IPP boilers as a result of the outages discussed. 59 60 61

(c) Review meetings shall be conducted at approximately 8-week intervals beginning approximately 32 weeks after effective date of the contract to review and discuss new outages, report on product design, and review recent experience. Design changes which are indicated by these meetings shall be made to each unit as the schedule allows. 63 64 65

5.2 Fabrication Phases of the Project: During the fabrication phases of the project, the following actions shall be taken by the AIP Task Force: 68

(a) A meeting shall be conducted at approximately 8-week intervals to review and discuss Quality Assurance practices and problems in the shop field. 70 71

(b) Changes and corrective action, based on problems discovered during fabrication, shall be made to each unit as the schedule allows. 73 74

5.3 Erection Phase of the Project: During the erection phase of the project, the following actions shall be taken by the AIP Task Force: 77

(a) A meeting shall be conducted at approximately 8-week intervals at the site to review and discuss erection and Quality Assurance practices and problems which occur in the field. 79 80

(b) Corrective action on successive units, based on problems which occurred during erection of previous units, shall be established and implemented as the schedule allows. 82 83

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

5.4 Start-Up and Operation of the Units: During 86
start-up and operation of the units, the following actions shall
be taken by the APC:

(a) A prestart-up review meeting shall be held 88
with the Project Manager's representatives approximately 6
months prior to start-up of the initial unit to discuss recent 89
start-up experience on similar units and schedule for start-up 90
of the IPP units.

(b) An operational review meeting shall be held 92
approximately every 8 weeks following the prestart-up review 93
meeting. During these meetings the task force shall review 94
operating experience and operational problems. These meetings 95
shall continue until the expiration of the AIP.

PART G - DETAILED SPECIFICATIONS 16

DIVISION G5 - OPTION FOR BURNER 18
MANAGEMENT CONTROL SYSTEM 19

1. General: If the Option for Burner Management Control System is exercised, the Contractor shall furnish a Burner Management Control System (BMC) for each Boiler Unit as specified hereunder. The detailed requirements set forth hereinafter describe one BMC System for a Boiler Unit and shall apply to each BMC System furnished under these specifications. Each BMC System shall meet all applicable detailed requirements of the Boiler Units. 23 24 25 26 27 28

2. Detailed Requirements: 30

2.1 General: A solid-state Burner Management Control (BMC) System shall be furnished to continuously monitor the furnace flame conditions and automatically and manually control start-up, trip, and purge of each pulverizer and its associated equipment, as required for safe furnace operation. The BMC System shall automatically start-up and supervise the ignitors and main burners after initiation by operating personnel, shall be capable of automatically and semi-automatically controlling the pulverizers, and shall be furnished complete with safety interlocks and trips. The BMC System furnished shall include, but not be limited to, the following: 33 34 35 36 37 38 39

2.1.1 Furnace purge, trip, and safety system. 41

2.1.2 Control panels with control station and indicators for mounting on the control bench, consisting of one panel for each pulverizer and one master panel. 43 44

2.1.3 Preamsembled plug-in cables as required for interconnecting the equipment furnished. 46

2.1.4 Cabinets suitable for installation in a terminal room located beneath a control room and input/output cabinets for connecting the BMC System to the associated field. Input/output (I/O) cabinets shall be designed for top or bottom access and shall be of sufficient size to allow installation of 3-inch conduit between terminals. Terminals in the I/O cabinet shall be States Company Type ZWM. A minimum of 25 percent spare terminal capacity shall be provided for future connections. 48 49 50 51 52 53

2.2 BMC System Functions: The BMC System shall perform the following functions: 56

DIVISION G5

2.2.1 Interface with boiler control systems and control components furnished by the IPA.	58
2.2.2 Operate ignitors, warm-up guns if applicable, and pulverizers, together with associated equipment after initiation by plant personnel of a single push button on the control panel. After manual or automatic initiation of an equipment start-up or shutdown, the BMC System shall automatically check the permissives, perform the sequential operation of individual pieces of equipment in an associated group, and check that all operations are successfully accomplished during both start-up and shutdown.	60 61 62 63 64
2.2.3 Provide for both normal, and contingency operation of equipment, including protective measures and manual clearing of the pulverizers if the pulverizers are tripped in the noncleared condition. Selector switches shall be provided for the selection of either remote manual or automatic mode of operation. Means shall be provided for individually starting, stopping, opening, and closing or positioning of each piece of controlled equipment from the control panel. Critical equipment shall be hardwired to the control stations for contingency operation.	66 67 68 69 70 71 72
2.2.4 Control all of the equipment required in the operation of the pulverizers. The equipment to be controlled shall include the following:	74 75
(a) Coal feeders.	77
(b) Pulverizers and burner shutoff valves.	79
(c) Primary air shutoff, burner register, and tempering dampers, as required.	81
(d) Seal air dampers.	83
(e) Coal valves.	85
(f) Fuel oil valves serving individual ignitors, warm-up guns if any, and ignitor and burner shutoff valves.	87 88
(g) Ignition transformers.	90
(h) Ignitors.	92
(i) Flame scanner blowers if required.	94

(j) Burner air registers or dampers.	96
(k) Pulverizer lube oil pumps.	98
2.2.5 Provide control actions for the following:	100
(a) Starting and stopping feeders and pulverizers.	102
(b) Opening and closing dampers and air registers.	104
(c) Inserting and retracting ignitors and oil guns.	106
(d) Energizing and de-energizing ignition transformers.	108
(e) Establishing a minimum or maximum demand for damper or air register position, primary air flow, and feeder speed.	110 111
(f) Releasing air damper position control and feeder speed control to analog control.	113
(g) Positioning if required for air registers.	115
2.3 <u>BMC System Design</u> : The BMC system design shall utilize proven concepts and hardware. The system design shall take into consideration the equipment failures, both within and external to the system. The design shall safeguard the Boiler and fuel equipment against fire, explosion and implosion hazards by the use of fail-safe features. All protective equipment shall be energized to perform a tripping function. A separate contact shall be provided for each intelligence input into the system. The system design shall utilize the following features:	118 119 120 122 123 124
2.3.1 <u>Status Feedback</u> : The state of all equipment controlled and the status indication shall be determined independent of command signals.	127
2.3.2 <u>Detection of Malfunction</u> : means shall be provided for detection and annunciation of equipment malfunctions. The malfunction is defined as the inability of executing commands generated through the control system.	130 131
2.3.3 <u>Pulverizer Carbon Monoxide (CO) Monitoring</u> : means shall be provided for continuously monitoring the CO concentration in each pulverizer and for alarming if the CO level increases rapidly or increases above acceptable limits.	133 134 135

DIVISION G5

Controls shall be provided to take protective measures if the CO 137
concentration exceeds a predetermined limit.

2.3.4 Equipment Trips: The BMC System shall initiate 140
equipment trips as required to prevent a hazardous operating
condition.

2.4 Control Station: The control station of the BMC 143
System shall include applicable selector switches or push
buttons and indicating lights. Indicating lights shall indicate 145
the initiation of the commands when on Automatic Mode,
indicate the sequence of initiation when on Manual Mode, and 146
indicate the successful execution of commands. These selector 147
switches/indicating lights shall include the following:

- (a) Automatic Mode - one per pulverizer. 149
- (b) Manual Mode - one per pulverizer. 151
- (c) Manual Mode With Flame Monitoring Bypassed - 153
one key lock switch per pulverizer.
- (d) Maintained Ignitors - one per pulverizer. 155
- (e) Start Pulverizer and Associated Equipment 157
Sequence - one per pulverizer.
- (f) Stop Pulverizer and Associated Equipment 159
Sequence - one per pulverizer.
- (g) Enable Burner - one per burner. 161
- (h) Disable Burner - one per burner. 163
- (i) Start Pulverizer - one per pulverizer. 165
- (j) Stop Pulverizer - one per pulverizer. 167
- (k) Open Air Damper - one per each independently 169
operated air damper.
- (l) Close Air Damper - one per each independently 171
operated air damper.
- (m) Start Feeder - one per feeder. 173
- (n) Stop Feeder - one per feeder. 175

(o) Open Coal Valve - one per coal valve.	177
(p) Close Coal Valve - one per coal valve.	179
(q) Open Burner Air Register - one per group of burners associated with a pulverizer.	181
(r) Open Burner Air Register to Light-off, if required.	183
(s) Close Burner Air Register to Light-off, if required.	185
(t) Start Ignitor - one per group of ignitors associated with a pulverizer.	187
(u) Stop Ignitor - one per group of ignitors associated with a pulverizer.	189
(v) Pulverizer Trip - one per panel.	191
(w) Larp Test - one per panel.	192
(x) An indicating light to indicate when a mill sweep is required.	195
(y) One light per pulverizer to indicate a malfunction in a piece of equipment associated with the pulverizer.	197
(z) Flame detection indication from each ignitor and burner.	198
(zz) One light per pulverizer to indicate the following:	200
(1) Primary Air Available	204
(2) Pulverizer Inlet Oil Pressure Satisfactory	206
(3) Primary Air Temperature Satisfactory	208
The operator shall be continuously informed of the progress of sequential operation by means of indicating lights when operating in either the Manual or Automatic Mode.	211

The control station shall also include a master control panel, burner compartment control panels, and a test panel. 213 214

2.4.1 Master Control Panel: The master control panel of the BMC System shall include the following backlighted push buttons: 217

- (a) Boiler Trip 219
- (b) Purge Start 221
- (c) Prelight Start 223
- (d) Lamp Test 225
- (e) Auto Ignitor Oil Pump and Trip Valve, if applicable 227
- (f) Start/Stop Ignitor Oil Pump, if applicable 229
- (g) Open/Close Ignitor Trip Valve, if applicable 231

The following shall also be indicated on the master control station panel as applicable: 233

- (a) Purge Conditions: 235
 - (1) Purge Required 237
 - (2) Purge in Progress 239
 - (3) Purge Complete 241
 - (4) Drum Level Within Limits 243
 - (5) Air Flow Greater Than 25 Percent 245
 - (6) All Air Registers Open 247
 - (7) Either Forced Draft Fan Running and Associated Damper Open 249
 - (8) Induced Draft Fan Running and Associated Damper Open 251
 - (9) All Flame Detectors Show No Flame 253

(10) All Pulverizers and Feeders Shut Down	255
(11) All Fuel Oil Shutoff and Trip Valves Closed, if applicable	257
(12) All Coal Valves Shut	259
(13) Primary and Secondary Air Heaters On	261
(14) All Air Heater Dampers Open	263
(15) Scanner Air Fan Running	265
(16) CO Within Limits	267
(17) All Pulverizer Air Flow at 5 Percent	269
(b) <u>Prelight Conditions:</u>	271
(1) Ignitor Oil Pressure Normal	273
(2) Atomizing Medium to Oil Pressure Differential Normal	275
(3) Windbox-to-Furnace Difference Pressure Satisfactory	277
(c) Status of all dampers and equipment.	279
2.4.2 <u>Furner Compartment Control Panel:</u> A burner compartment control panel shall be provided for each pulverizer. Each burner compartment control panel shall be provided with a flashing indicator Fault Light which shall identify the particular compartment or compartments that caused the alarm condition. A Fault Light reset push button shall be provided on each control panel, and the reset operation shall allow the light to be extinguished only when the fault or alarm condition has been cleared or when the compartment has been shutdown. In addition, each burner compartment control panel shall be provided with an assembly of indicator lights and one push button complete with engraved legends for indication or operation as follows:	282 283 284 285 286 287 288
(a) Ignitor Ret By-Passed shall indicate that the ignitor flame detector is bypassed.	290

(b) Ignitor Req'd shall indicate that the ignitor is required for either light-off of the burner compartment or low load operation. 292 293

(c) Ignitor On shall indicate when the ignitor flame detector has proven the presence of a flame. 295

(d) Burner in Sequence shall be indicated by a flashing light when the burner compartment is in the light-off sequence. 297 298

2.4.3 Test Panel: A test panel shall be provided for simulating and testing the functioning of the logic systems. 301
The test panel shall provide means for quickly diagnosing malfunctions of logic systems or components. A test switch shall be available to allow the operator to operate equipment from the control panel. Diagnostic and test equipment required to isolate malfunctions at the level of individual circuit boards shall be furnished. 302 303 304 305

2.4.4 Logic Functions: Logic functions shall be performed electronically with solid-state hardware. The control logic shall be reprogrammable in 2 hours. Control outputs shall be accomplished with interposing relays or solid-state equipment with a nonvolatile memory circuit to prevent inadvertent operation upon a power failure. All control wiring between controlled equipment and control system shall be made through terminals in I/O cabinet. 309 309 310 311 312 313

2.4.5 Alarms: The IPA will furnish an Annunciating/Monitoring System to monitor the various control systems. Alarm contacts indicating when back-up systems are brought in service, when limits are exceeded, or when malfunctions occur shall be furnished for use by the Annunciating/Monitoring System. 314 317 318

The following minimum number of alarms shall be developed by the BMC System for use on the Annunciator/Monitoring System: 320 321

- (a) Pulverizer Tripped - one per pulverizer. 323
- (b) Pulverizer Overloaded - one per pulverizer. 325
- (c) Primary Air Flow Tripped - one per pulverizer. 327
- (d) Pulverizer No Load - one per pulverizer. 329

DIVISION G5

pulverizer.	(e) Coal Stoppage to Pulverizer - one per	331
	(f) High CO in Coal-Air - one per pulverizer.	333
pulverizer.	(g) High Coal-Air Temperature - one per	335
voltage level.	(h) Loss of Control Power - one per source and	337
	(i) Loss of Flame - one per burner and ignitor.	339
	(j) Fuel Trip.	341
	(k) Feeder Tripped - one per feeder.	343
	(l) Sequence Interruption When on Automatic Mode	345
During Start-Up or Shutdown of Pulverizers and Associated		346
Equipment - one per pulverizer per shutdown and one per start-up		
sequence.		
design and operation.	(m) Additional alarms as required by the system	348

PART G - DETAILED SPECIFICATIONS 16

DIVISION G6 - DETAILED REQUIREMENTS FOR 18
OPTION TO ERECT ECILER UNITS 19

1. General: If the option to erect Eciler Units 23
referred to in the Execution Document is exercised, the
Contractor shall erect the 4 Eciler Units complete and ready for 24
operating tests.

All material and equipment furnished by the Contractor 26
shall be installed and properly supported by the Contractor, 27
except as specified in Article 3 of this Division.

All equipment installed on IPA-constructed foundations 29
shall be grouted.

The Contractor shall perform air leakage tests and 31
point-to-point pneumatical and electrical continuity checks of 32
all controls.

2. Additional Equipment Furnished by the Contractor: 34
All equipment and incidental material necessary to erect the 35
Boiler Units shall be furnished.

For tube temperature monitoring, the Contractor shall 37
furnish and attach thermocouples, furnish waterproof junction 38
boxes located on one side of the Eciler Units, and extend the 39
thermocouple leads to the junction boxes. Terminal coupler 40
shall be shielded and marked according to size, type and
location. Junction boxes shall be equipped with Western 41
Electric Company Type 30 terminal strips with Type 102 adapters.

Rear supports for scotchblowers shall be furnished. 43

3. Equipment Furnished by the Contractor and 45
Installed by the IPA: The following equipment furnished by the 46
Contractor will be installed by the IPA:

(a) Reheat spray desuperheater assemblies. 48

(b) All control valves between the Contractor's 50
equipment and equipment furnished by the IPA.

(c) Control panels for mounting on the control 53
bench, if furnished under the Option for Burner Management 54
Control System.

Add 4. *NOTE #2 3/23/83 csc*

4.1

4.2

4.3

4.4

- "(d) Superheater outlet and reheater inlet and outlet safety valves.
- (e) Electromatic relief valves or equivalent.
- (f) Motor-operated stop valves for the electromatic relief valves.
- (g) Superheater outlet and reheater outlet vent valves.
- (h) Superheater outlet valve for nitrogen blanketing."

ADD PER C.O.
2, ITEM 18g

- "(i) ~~(g)~~ Coaxial cables, video monitors, and panel mounting hardware associated with the furnace flame viewing television system."*

C.O. #3
ITEM 2(e)

* SEE C.O. #2 FOR PRICE ADJUSTMENT CLAUSE FOR LUMP SUM PRICES, ITEM 2(g)

- (j) "(h) Oil-electric ignition system main lighter oil piping control valves and their associated inlet and outlet isolation valves."

C.O. #3
ITEM 9

"4. Equipment Furnished by the IPA and Installed by the Contractor

4.1 General. Two forced draft fans, less electric drive motors, will be supplied for each boiler by TLT-Babcock, Inc. under Specification 9255.62.3402.

4.2 Description. The fans will be horizontal shaft, single-stage, axial type with adjustable pitch blades, TLT-Babcock Model FAF 37.5/18-1.

Each fan will be furnished with a discharge damper, lubricating oil package, hydraulic oil package, inlet silencer, inlet transition piece, vertical discharge elbow, blade pitch control drive and connecting linkage, discharge damper control drive and connecting linkage, shaft coupling, and associated instrumentation.

4.3 Erection. The forced draft fans will be unloaded, hauled to storage if necessary, and erected under these specifications. Erection work shall include field assembly of the furnished components, rough setting, installing stainless steel (ASTM A312 Type 304) lube oil and hydraulic oil piping, and finish setting of the fans and their drive motors. Drive motors will be furnished and rough set under separate specifications.

All lubricants and oils, including flushing oil, will be furnished by the IPA. The Contractor shall be responsible for applying all lubricants and oils.

After complete lube oil piping erection, and prior to initial operation of the fans, the Contractor shall thoroughly clean, flush, and check out the lube oil and hydraulic oil system to ensure their proper operation.

The cleaning and flushing operation shall include circulating oil through the bearing system for an extended period of time, in accordance with the manufacturer's recommendation; thoroughly cleaning oil reservoirs; removal and replacement of oil filters, if required; and careful removal and inspection of bearing caps. Bearing cavities shall be free of all foreign material. Care shall be taken to ensure that no foreign materials enter the bearing cavity during the final cleaning operation.

If field balancing of the forced draft fans is required, the Contractor shall provide all labor and equipment, including balancing equipment, required to install the balancing weights. The IPA will furnish the services of the manufacturer's representative to direct the work.

4.4 Manufacturer's Field Services. The services of ~~field representatives~~ field representatives have ~~not been included~~ under the above referenced specification. The Contractor shall advise the Project Manager of the number and duration of visits by the manufacturer's representatives required for inspection of the installation of the fans. The Contractor shall make arrangements with the Project Manager to have the manufacturer's representatives inspect the equipment prior to initial operation and be present during initial operation of the equipment."

CP. # 2
ITEM 10

G6-2(a)

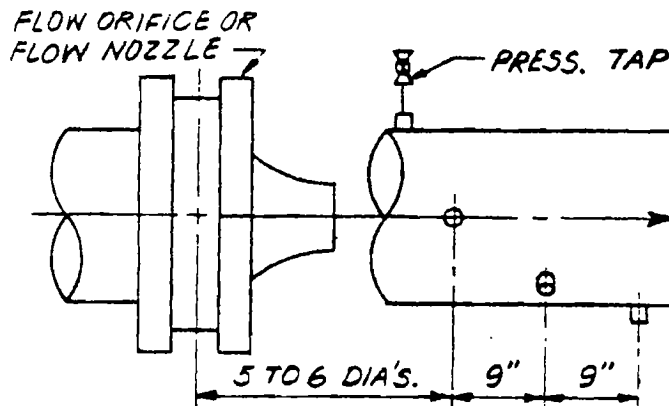


FIG. 1

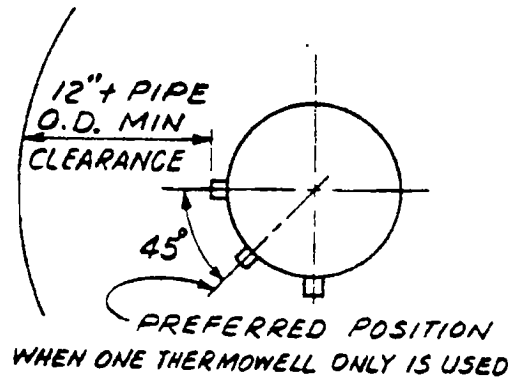


FIG. 2

1. SYSTEMS BELOW 500° F OR 500 PSI, BUT NOT INCLUDING CEMENT LINED, USE: 3/4" SCREWED HALF COUPLING (IF EXISTING AND LARGER, REDUCE TO SIZE). SEE DWG SL-MD54 FOR USE WITH AND WITHOUT INSULATION.
2. SYSTEMS OVER 500° F OR 500 PSI USE THERMOWELLS WELDED DIRECTLY INTO PIPE.
THERMOWELL FOR 6" AND UP PIPE SEE DWG. SL-MD55
3. FOR CAPILLARY TYPE THERMOWELLS SEE DWG. SL-MD56
4. THERMOWELL WELDING DETAILS FOR 6" AND LARGER PIPE SEE DWG. SL-MD57
5. ADJUSTMENTS TO DWG. SL-MD57 MAY BE NECESSARY FOR SYSTEMS WITH HIGH FLUID VELOCITIES. CHECK WITH THE ASME POWER TEST CODE FOR PROPER INSERTION LENGTHS.
6. FOR CEMENT LINED PIPE (UNLESS SPECIFIED BY THE ENGINEER) USE 1-1/4" STAINLESS STEEL SCREWED HALF COUPLING AND 1-1/4" X 3/4" DIELECTRIC BUSHING INSTALLED PER DRAWING SL-MD58.
7. THERMOWELL INSTALLATIONS FOR PIPE SMALLER THAN 6" PER ENGINEERS INSTRUCTIONS.
8. WHEN TWO OR MORE THERMOWELLS ARE ADJACENT TO EACH OTHER THE SPACING SHALL BE APPROXIMATELY 9 INCHES APART AND THEY SHALL BE STAGGERED 45° CIRCUMFERENTIALLY AROUND THE PIPE AS SHOWN IN FIG. 2 ABOVE.
9. ALLOW 12" + PIPE O.D. MINIMUM RADIAL CLEARANCE ALONG THERMOWELL AXIS FOR INSTALLATION OF THERMOCOUPLE.
10. INSTALLATION OF THERMOWELLS PREFERRED DOWNSTREAM FROM PRESSURE CONNECTION AND FLOW METER AS SHOWN IN FIG. 1 ABOVE. UPSTREAM INSTALLATION CAN BE USED AS AN ALTERNATE WITH ENGINEER'S APPROVAL.

Approved	Date
<i>E. H. ...</i>	7-21-80

INTERMOUNTAIN POWER PROJECT
TEMPERATURE CONNECTIONS
INSTRUMENTS & CONTROLS

SL-MD53

BRASS KNURLED
HEAD PLUG
1" NPT

PIN OR SCREW

BRASS SAFETY CHAIN
NO. 2, 6" LONG

PIN OR SCREW

PIPE SIZE	A	U	T
6" TO 8"	6 1/4	2 1/2	2
10" TO 16"	9 1/4	4 1/2	3
18" & UP	12 1/4	7 1/2	3

NOTE:

1. 1/4" DIA ELEMENT
2. FOR USE WITH CONDITIONS
BELOW 500°F OR 500 PSI

STANDARD MATERIALS
BRASS (ASTM B-16)
STAINLESS STEEL, TYPE 304
STAINLESS STEEL, TYPE 316
MONEL

Approved _____ Date _____
R. N. Lee J. H. Anthony 7-21-50

INTERMOUNTAIN POWER PROJECT
 SCREWED THERMOWELL
 INSTRUMENTS & CONTROLS

SL-MD54

1" NPT. WELL TO BE CLEANED
 OF ALL DRILLINGS AND
 FOREIGN MATTER BEFORE
 PLUGGING FINGER TIGHT.

3" WRENCH
 ALLOWANCE

STAMP MATERIAL
 DESIGNATION
 ON TOP

LAGGING
 THICKNESS IF
 APPLICABLE

THREAD
 ALLOWANCE

U INSERTION LENGTH

A
 (NOT INCLUDING LAGGING THICKNESS)

1/4" NPT
 1/4" DIA.

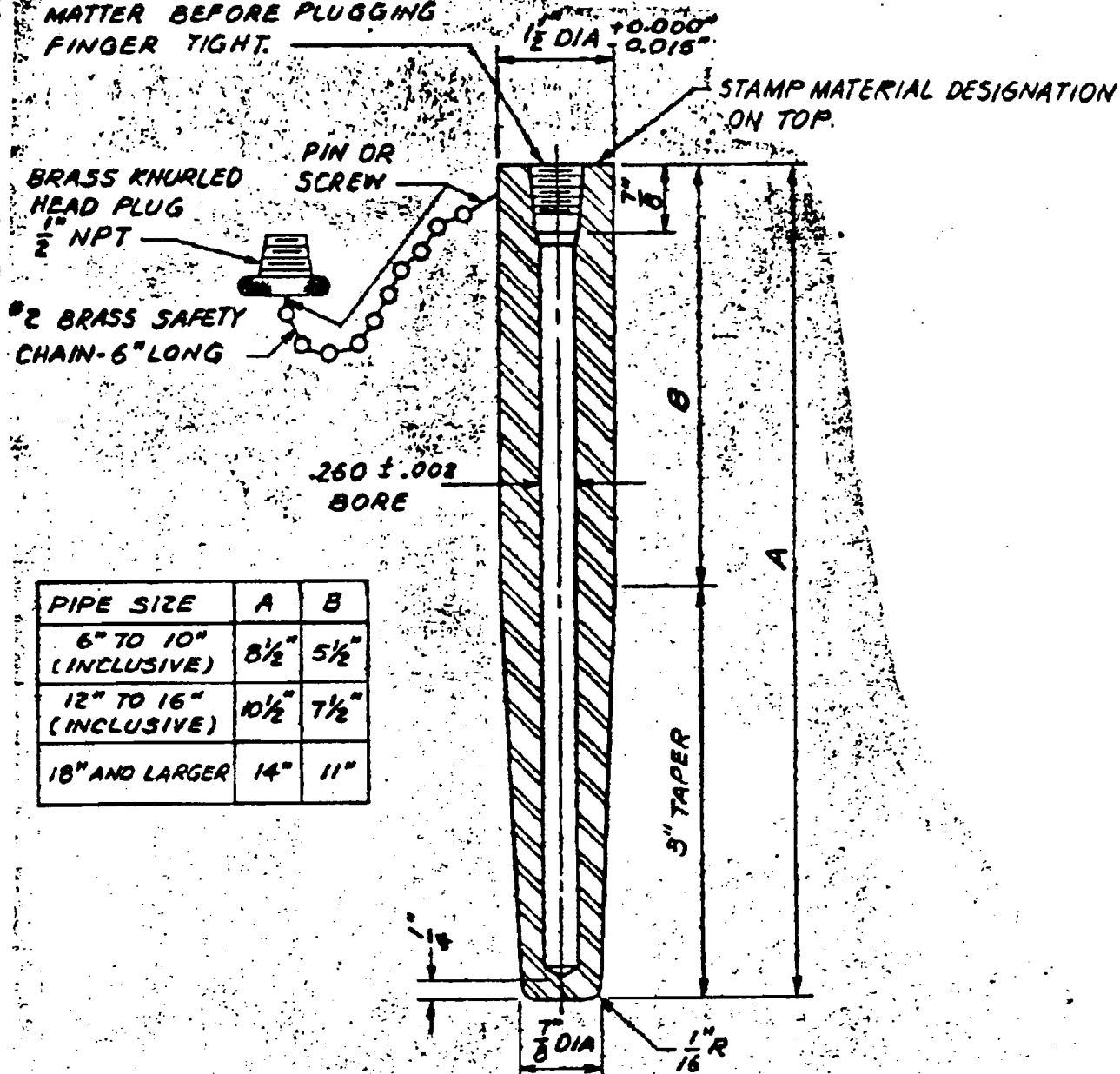
1002
 260 BORE

1/4" DIA

IPD

FOR THERMOWELL INSTALLATION
DETAILS SEE DWG SL-MD57

1" NPT. WELL TO BE CLEANED
OF ALL DRILLINGS AND FOREIGN
MATTER BEFORE PLUGGING
FINGER TIGHT.



PIPE SIZE	A	B
6" TO 10" (INCLUSIVE)	8 1/2"	5 1/2"
12" TO 16" (INCLUSIVE)	10 1/2"	7 1/2"
18" AND LARGER	14"	11"

260 ± .002
BORE

STANDARD MATERIALS

AISI 4130 CHROME-MOLY
STAINLESS STEEL, TYPE 304L
STAINLESS STEEL, TYPE 316

NOTE:

1. COLD HYDROSTATIC
TEST TO 5600 PSI.

2. 1/4" DIA. ELEMENT.

3. FOR USE WITH CONDITIONS
ABOVE 500°F OR 500 PSI.

INTERMOUNTAIN POWER PROJECT

WELDED THERMOWELL
INSTRUMENTS & CONTROLS

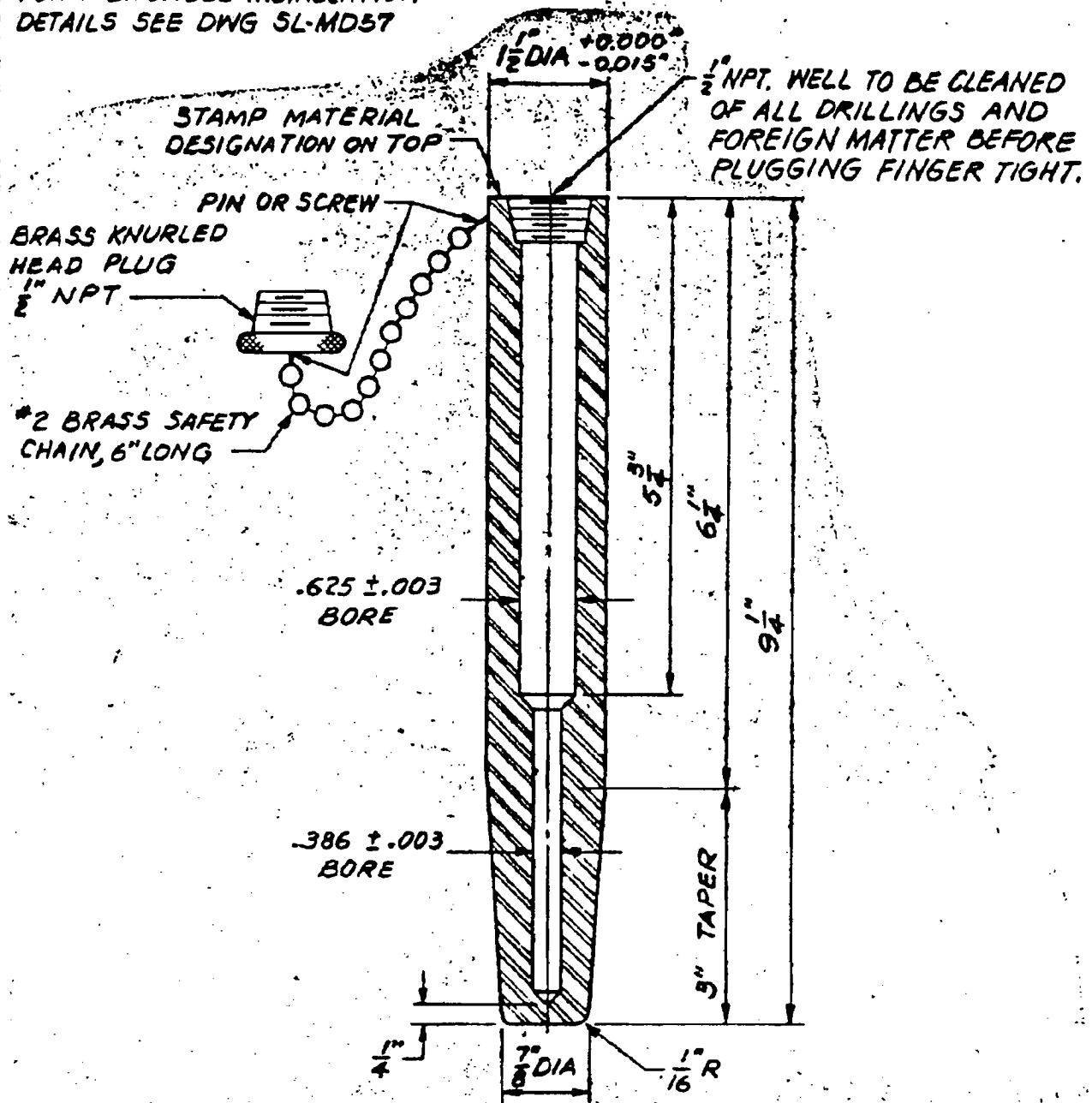
Approved

Date

Approved for J. H. Anthony, 4-21-80

SL-MD55

FOR THERMOWELL INSTALLATION
DETAILS SEE DWG SL-MD57



NOTE:

1. COLD HYDROSTATIC TEST TO 5600 PSI.
2. 3/8" DIA. ELEMENT.
3. PIPE SIZE 6" & LARGER.

STANDARD MATERIALS

AISI 4130 CHROME-MOLY

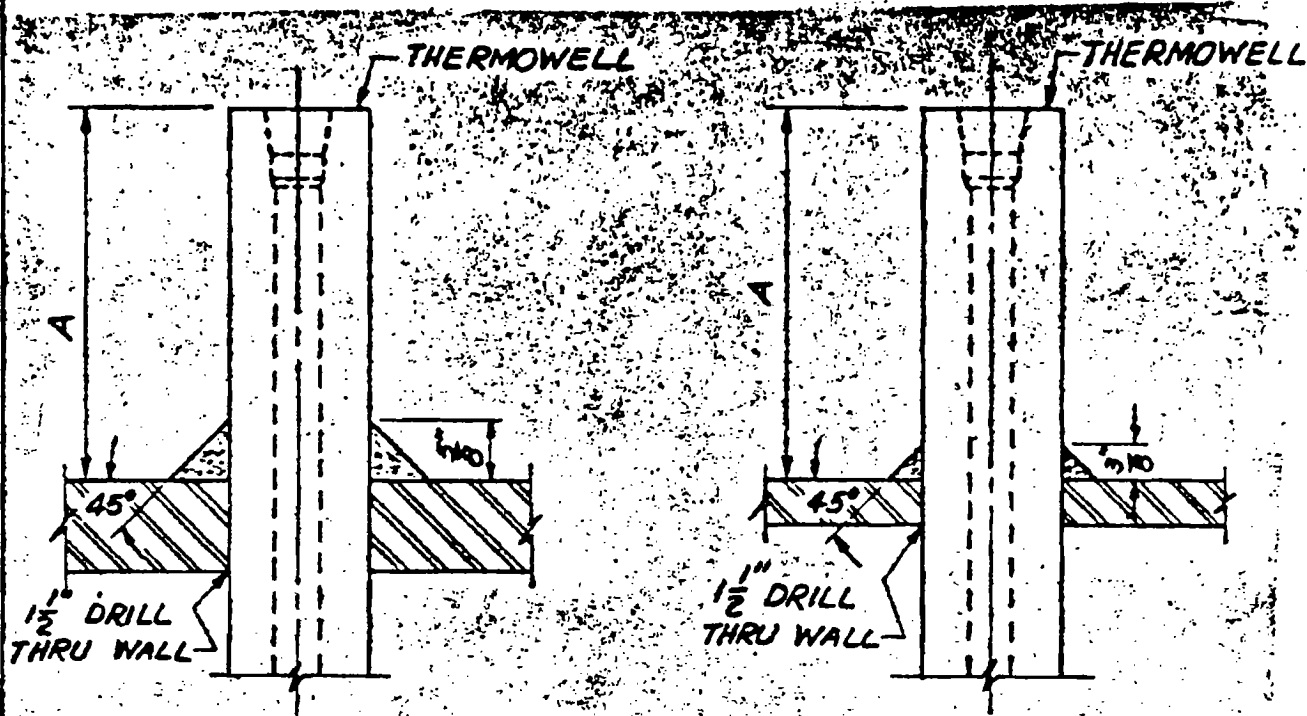
STAINLESS STEEL, TYPE 304 L

STAINLESS STEEL, TYPE 316

Approved	Date
<i>RON or Lab J. H. Anthony</i>	7-21-20

INTERMOUNTAIN POWER PROJECT
9 1/4" WELDED
CAPILLARY THERMOWELL
INSTRUMENTS & CONTROLS

SL-MD56



FOR PIPE WALL THICKNESS OVER $\frac{3}{4}$ "

FOR PIPE WALL THICKNESS $\frac{3}{4}$ " AND UNDER

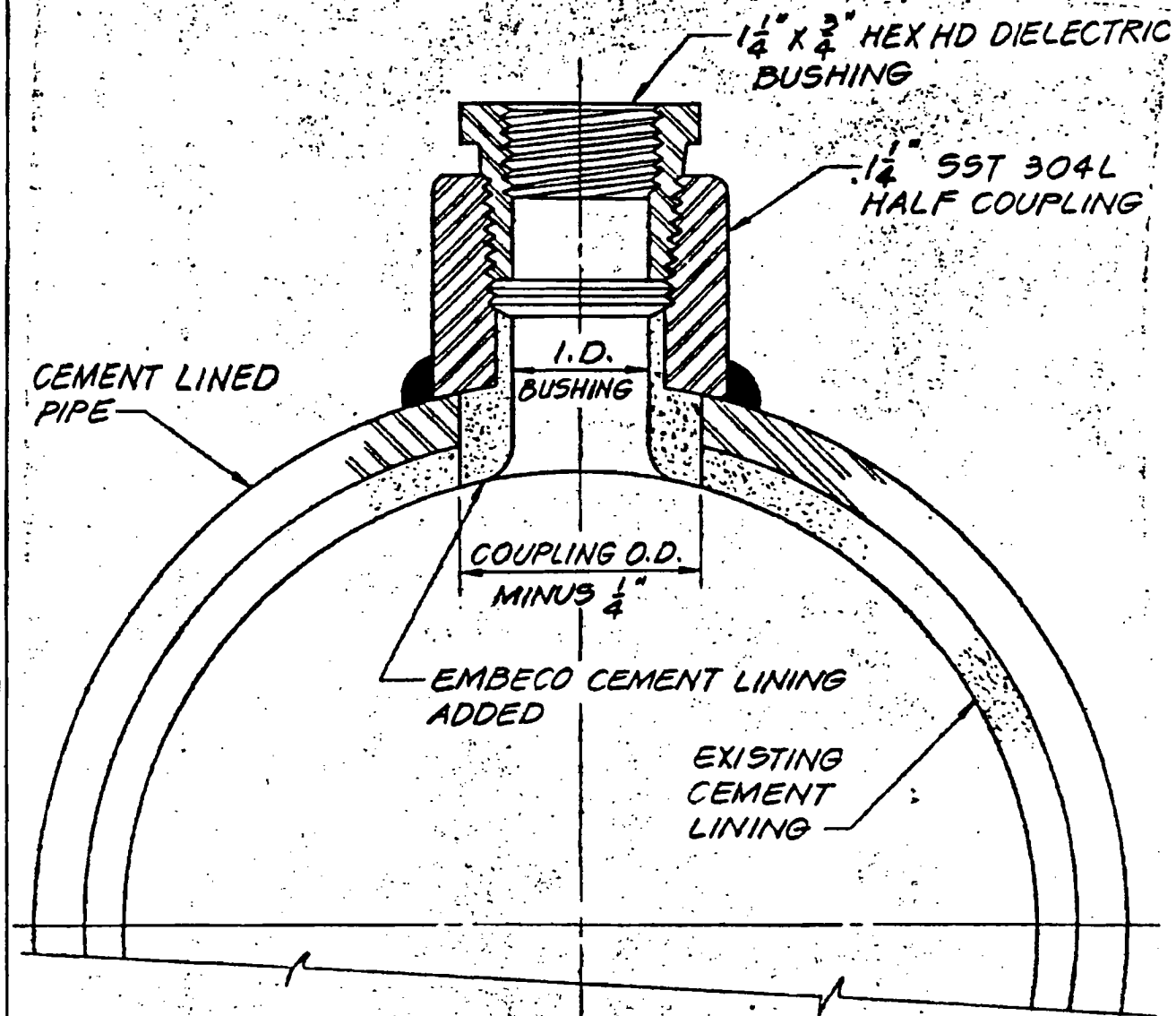
THERMOWELL LENGTH	PIPE SIZE	A	DRAWING
8½", 9¼"	6"	5"	SL-MD55 & MD56
	8"	4½"	SL-MD55 & MD56
	10"	4"	SL-MD55 & MD56
9¼", 10½"	12"	4½"	SL-MD55 & MD56
	14"	4"	SL-MD55 & MD56
	16"	4"	SL-MD55 & MD56
9¼", 14"	18" & LARGER	6"	SL-MD55 & MD56

"A" DIMENSIONS OTHER THAN THOSE SHOWN SHALL BE NOTED ON THE PIPING OR EQUIPMENT DRAWING.

Approved _____ Date _____
Ed. H. J. H. Anthony 4-21-80

INTERMOUNTAIN POWER PROJECT
 WELDED THERMOWELL
 INSTALLATION DETAILS
 INSTRUMENTS & CONTROLS

SL-MD57



Approved	Date
<i>Q. H. Anthony</i>	4-21-00

INTERMOUNTAIN POWER PROJECT
THERMOWELL CONNECTION -
CEMENT LINED PIPE
INSTRUMENTS & CONTROLS

SL-MD58

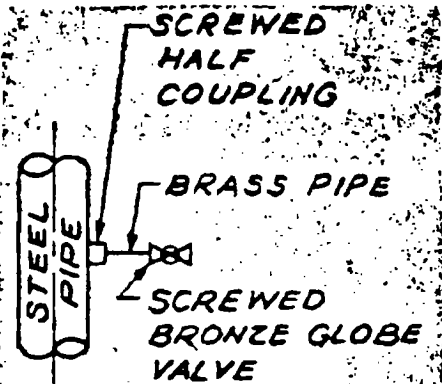


FIG. 1

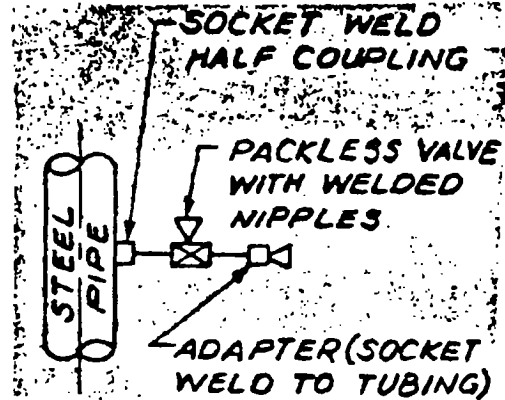


FIG. 2

1. SYSTEMS BELOW 900 PSI OR 800° F, BUT NOT INCLUDING FUEL OIL OR SYSTEMS CONTAINING AERATED WATER OR NON-CORROSIVE GASES, USE 1/2" 6000# SOCKET WELD HALF COUPLING AND SCHEDULE 160 PIPE PER DWG. SL-MD60. (SEAL WELD EXISTING SCREWED CONNECTIONS. IF CONNECTION IS LARGER THAN 1/2" REDUCE TO 1/2".)
2. SYSTEMS OVER 900 PSI OR 800° F, AND ALL FUEL OIL PIPING, USE 1" SOCKET WELD HALF COUPLING AND PIPE PER DWG. SL-MD60. (MINIMUM PIPE SCHEDULE TO BE 160.)
3. SYSTEMS CONTAINING AERATED WATER USE 1" 3000 LB. SCREWED HALF COUPLING AND EXTRA STRONG PIPE.
 - (A) CEMENT LINED PIPE PER DWG. SL-MD61.
 - (B) COPPER WATER TUBE USE TEE, BUSHING, BRASS PIPE AND SCREWED BRONZE GLOBE VALVE.
4. SYSTEMS CONTAINING NON-CORROSIVE GASES USE 1/2" 3000 LB. SCREWED HALF COUPLING AND EXTRA STRONG PIPE.
 - (A) STEEL PIPE PER FIG. 1.
 - (B) BRASS PIPE USE TEE, BUSHING, XS BRASS PIPE AND SCREWED BRONZE GLOBE VALVE.
5. FOR VACUUM SERVICE USE 1/2" 6000# SOCKET WELD HALF COUPLING AND PACKLESS VALVE WITH WELDED NIPPLES PER FIG. 2.
6. CHECK LINE DIAGRAM FOR CORRECT VALVE RATING AND MATERIAL.
7. THE PRESSURE CONNECTION SHOULD BE INSTALLED IN A NON-TURBULENT ENVIRONMENT AND IN A STRAIGHT RUN OF PIPE REMOTE FROM ELBOWS, UPSTREAM OF THERMOWELLS OR OBSTRUCTIONS, PREFERABLY ON THE SIDE OF THE PIPE FOR LIQUIDS AND ON THE TOP FOR STEAM AND GASES. A BOTTOM LOCATION SHALL NOT BE USED FOR STEAM SERVICE.

INTERMOUNTAIN POWER PROJECT

**PRESSURE CONNECTIONS
INSTRUMENTS & CONTROLS**

Approved	Date
<i>R. H. Ford J. H. Cantelmo</i>	4-21-80

SL-MD59

SOCKET WELD INLET
SCREWED OUTLET
GLOBE VALVE

PIPE

6000#
SOCKET WELD
HALF COUPLING

45°

GRIND HALF COUPLING
TO CURVATURE OF HEADER

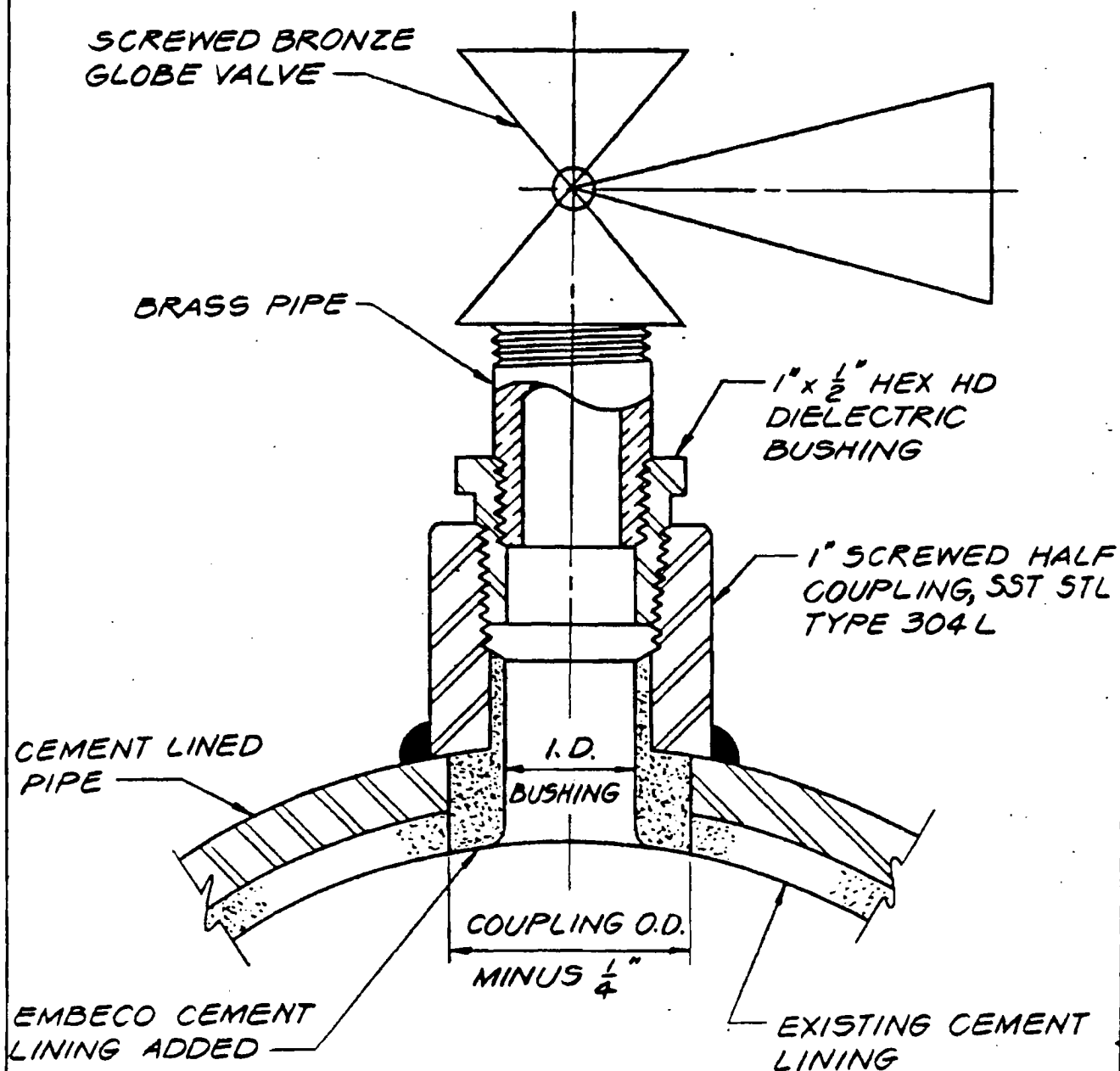
DRILL HOLE AFTER WELDING.
EDGE OF HOLE TO BE SHARP,
SQUARE AND FREE FROM
BURRS OR OTHER IRREGU-
LARITIES.


PIPE SIZE	C
1/2"	3/8"
1"	1/2"

Approved	Date
<i>R. H. Lee J. H. Anthony</i>	4-21-80

INTERMOUNTAIN POWER PROJECT
PRESSURE CONNECTION -
SOCKET WELD HALF COUPLING
INSTRUMENTS & CONTROLS

SL-MD60



		INTERMOUNTAIN POWER PROJECT PRESSURE CONNECTION - CEMENT LINED PIPE INSTRUMENTS & CONTROLS	
		SL-MD61	
Approved		Date	
<i>RW 10-28 J. H. Anthony</i>		<i>10-21-20</i>	

1. WHEN THE TEMPERATURE OF THE FLOWING FLUID DIFFERS MATERIALLY FROM THE AMBIENT, THE PRIMARY ELEMENT PREFERABLY SHOULD BE LOCATED IN A HORIZONTAL LINE.
2. TO DETERMINE THE PIPING REQUIREMENTS FOR ORIFICES, FLOW NOZZLES AND VENTURI TUBES REFER TO ASME STANDARDS. SELECT THE PIPING ARRANGEMENT THAT IS NEAREST THE ACTUAL PIPING USED. THIS DRAWING SHALL BE USED FOR GENERAL DESIGN ONLY. FOR SPECIFIC DESIGN REFER TO INSTRUMENTS AND CONTROLS ENGINEER.
3. ALL CONTROL VALVES MUST BE INSTALLED ON OUTLET SIDE OF PRIMARY ELEMENT.
4. FOR PRESSURE CONNECTIONS OTHER THAN FLANGE TYPE CONNECTIONS SEE ASME POWER TEST CODE (PTC 19.5; VOL.4).

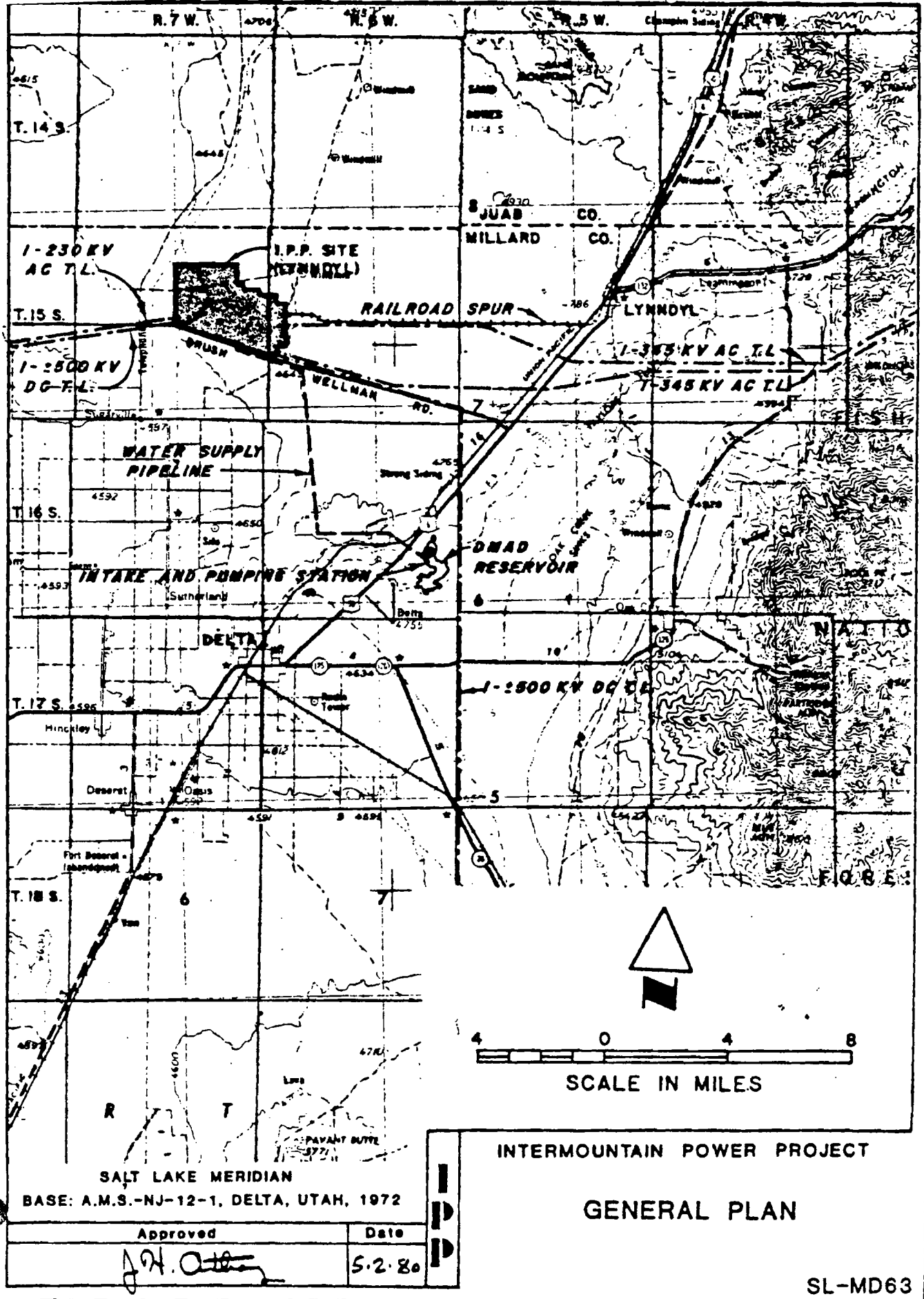
Approved	Date
<i>RW 10-11-88 J. H. Cantelero</i>	<i>10-11-88</i>

I
P
P

INTERMOUNTAIN POWER PROJECT
FLOWMETER CONNECTIONS
INSTRUMENTS & CONTROLS

SL-MD62

*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.



*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

EXHIBIT A

D R A F T

(To Be Issued By Bank)

(Date)

Customer _____

Address _____

Subject : Irrevocable Standby Letter of Credit
No. xxxx

Gentlemen:

By order of our client, the Babcock & Wilcox Company (B&W), we hereby open our Irrevocable Standby Letter of Credit No. xxxxx in your favor for a maximum aggregate amount not to exceed \$ _____ (_____ U.S. Dollars), this amount representing _____% (_____ percent) of the total Contract Price for Unit _____ under Contract _____ between yourselves and B&W executed and effective _____ for the supply and erection of the boiler unit and associated equipment for your _____ Station.

This Letter of Credit is issued in consideration of your making payments of 100% of the Contract Price in accordance with Article _____ of the Contract and is in lieu of retention. The primary purpose hereof is to assure B&W's satisfactory performance of the Contract and satisfactory completion of the Acceptance Test referred to in Article _____, Pages _____ and _____ of the Contract.

This Letter of Credit becomes effective immediately and will remain in effect until expiration in accordance with the Terms hereof.

Funds under this Letter of Credit No. xxxx are available to you at our (insert bank's address) office against your sight draft(s) drawn on us accompanied by your signed written statement certifying: (a) you have given written notification to B&W thirty (30) days prior to this drawing of your intent to draw under this credit due to B&W's failure to satisfactorily perform the Contract or B&W's failure to satisfactorily fulfill the Acceptance Test; (b) B&W has not commenced nor is diligently pursuing corrective action within such thirty (30) day notification period; and (c) B&W remains in default at time of your drawing. Your sight draft must also be accompanied by a certified copy of the letter delivered by you to B&W thirty (30) days prior to the date of the drawing giving B&W notice of your intent to draw under this credit. The bank shall accept the IPA's certification of fact.

EXHIBIT A

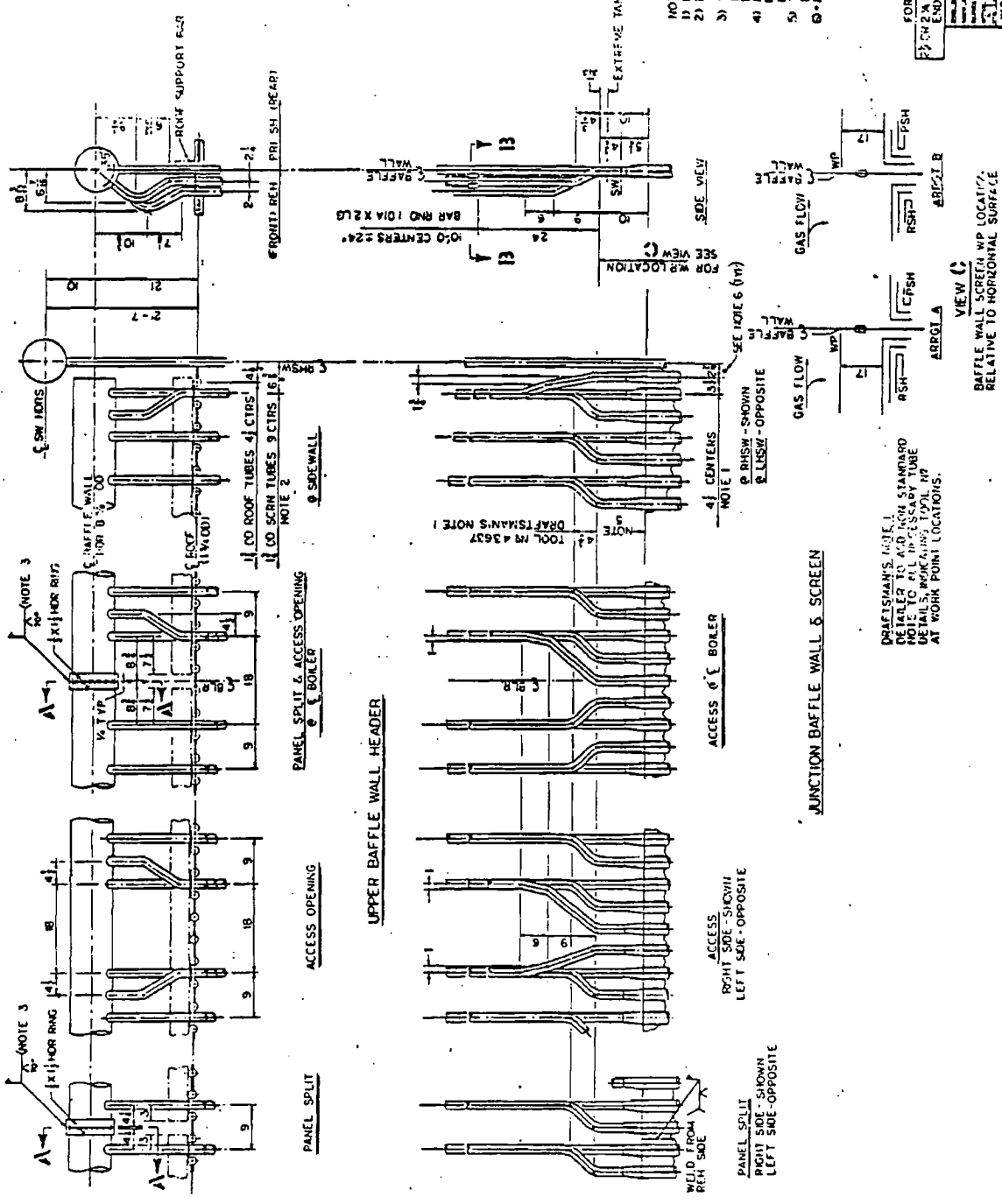
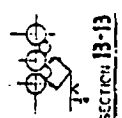
- 2 -

This Letter of Credit shall expire at our (insert bank location) office upon our receipt of a certified copy of your written Acceptance of Unit _____ in accordance with Article 21 of the Contract or on _____, whichever shall first occur.

This Letter of Credit is subject to the Uniform Customs and Practice for Documentary Credits (1974 revision), International Chamber of Commerce Brochure No.290.

Address all drafts and correspondence regarding this Letter of Credit to the attention of (per bank instructions) at the above mentioned address, specifically mentioning our Letter of Credit No.xxxx.

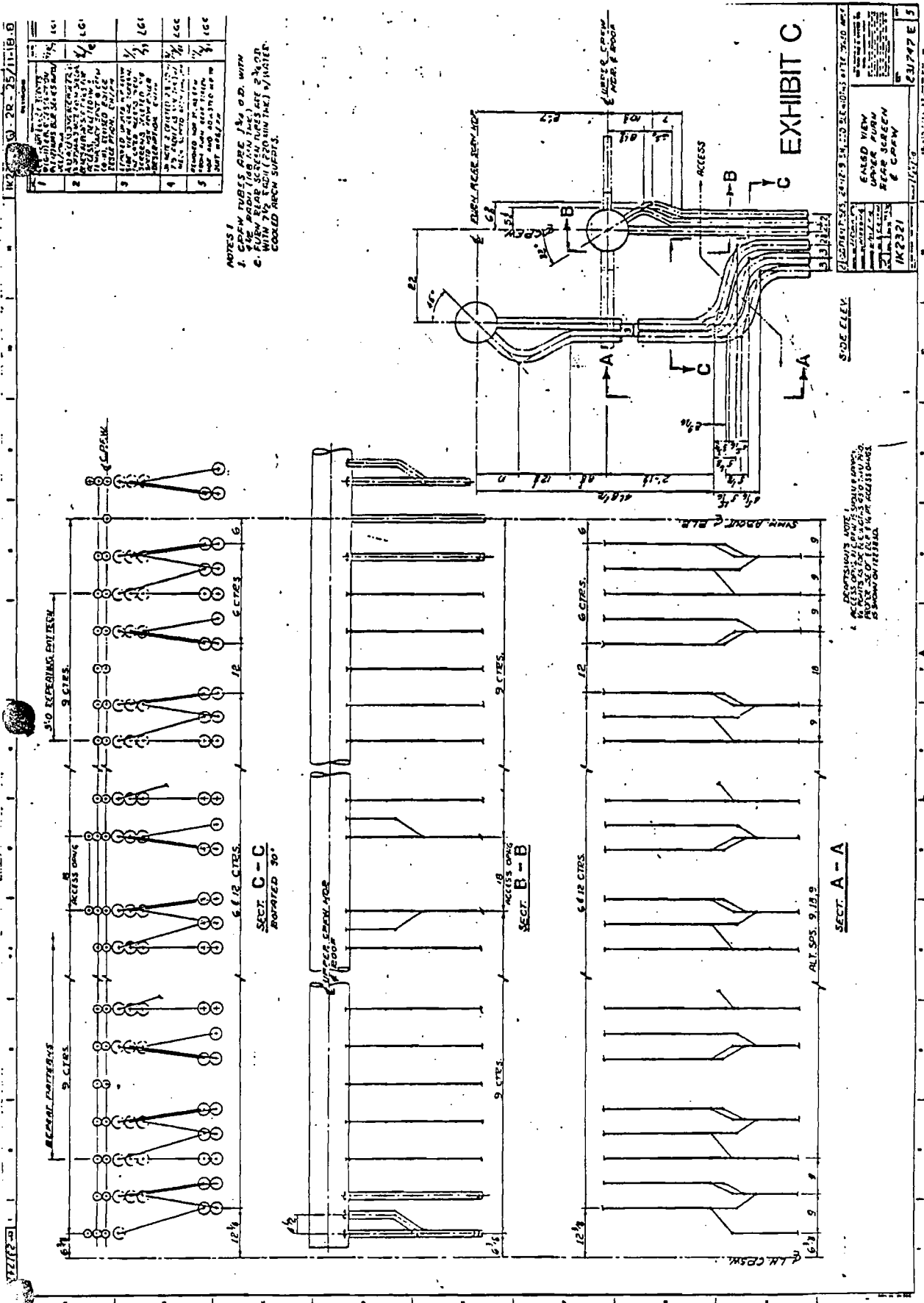
(Signature)



- NOTES
- 1) BUFFLE WELD TUBES ARE 2 1/4" OD
 - 2) BUFFLE SCREEN TUBES ARE 1 1/2" OD WITH A 1/2" END RADIUS
 - 3) SHOPS & SPECIFIC FIELD HEADS AT HEADS: THE FIELD HEADS ARE 1 1/2" OD
 - 4) 1/2" OD 1/2" ID
 - 5) PANEL SPACERS AND ACCESS OPENING: THE DIMS 2 1/2" DIA THRU DIMS 2 1/2" DIA
 - 6) TERMINATE WELDING PER DWG 7336E
 - 7) DETAIL F
 - 8) 1/4" OD 1/2" ID FURNISHES FEEDS EDGE DIMS 2 1/4"

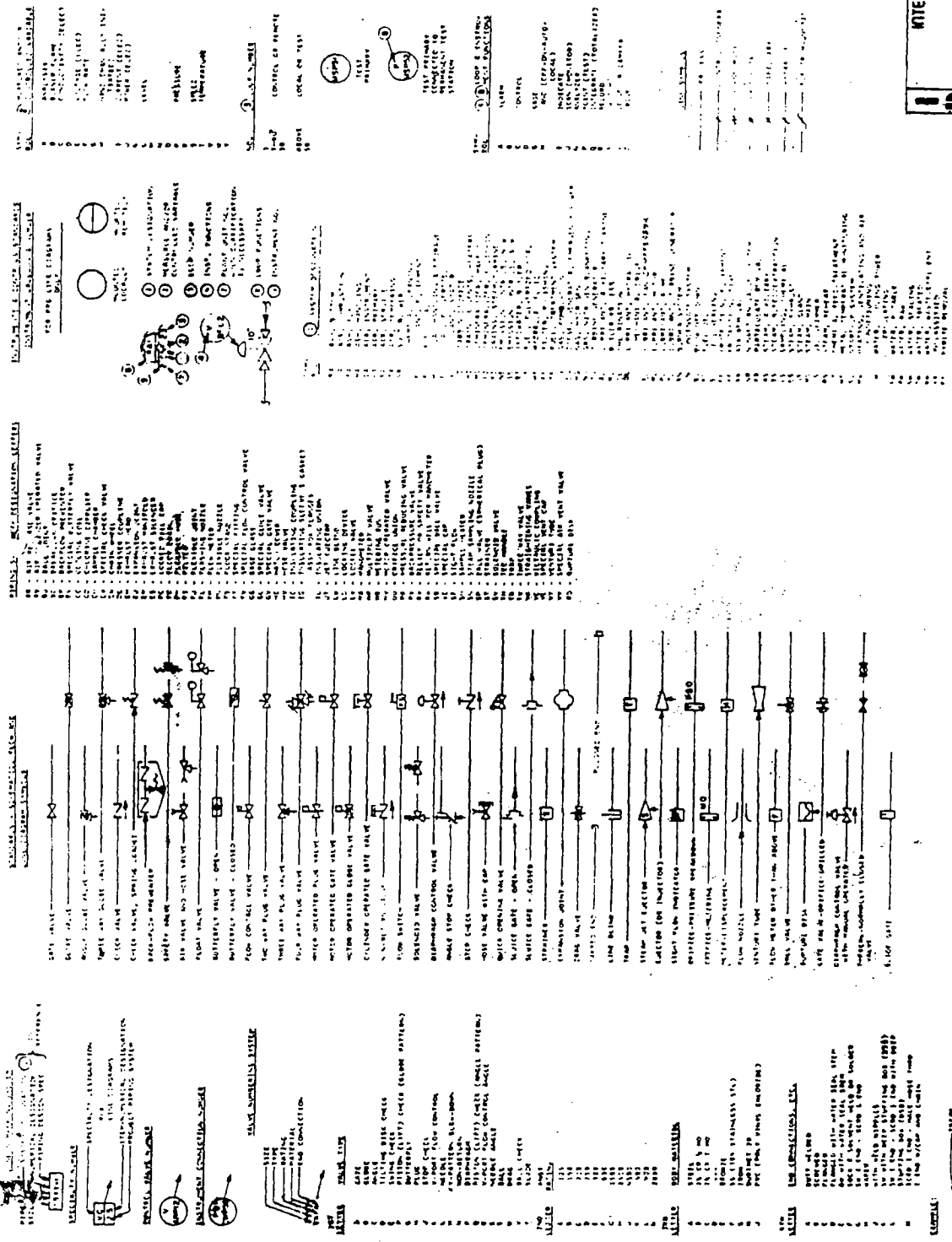
EXHIBIT B

FOR ADAPT SEE CMC 145272D		23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044	
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MDC 58-94-80

INTERMOUNTAIN POWER PROJECT
LINE DIAGRAMS
PIPING & INSTRUMENT INDEX

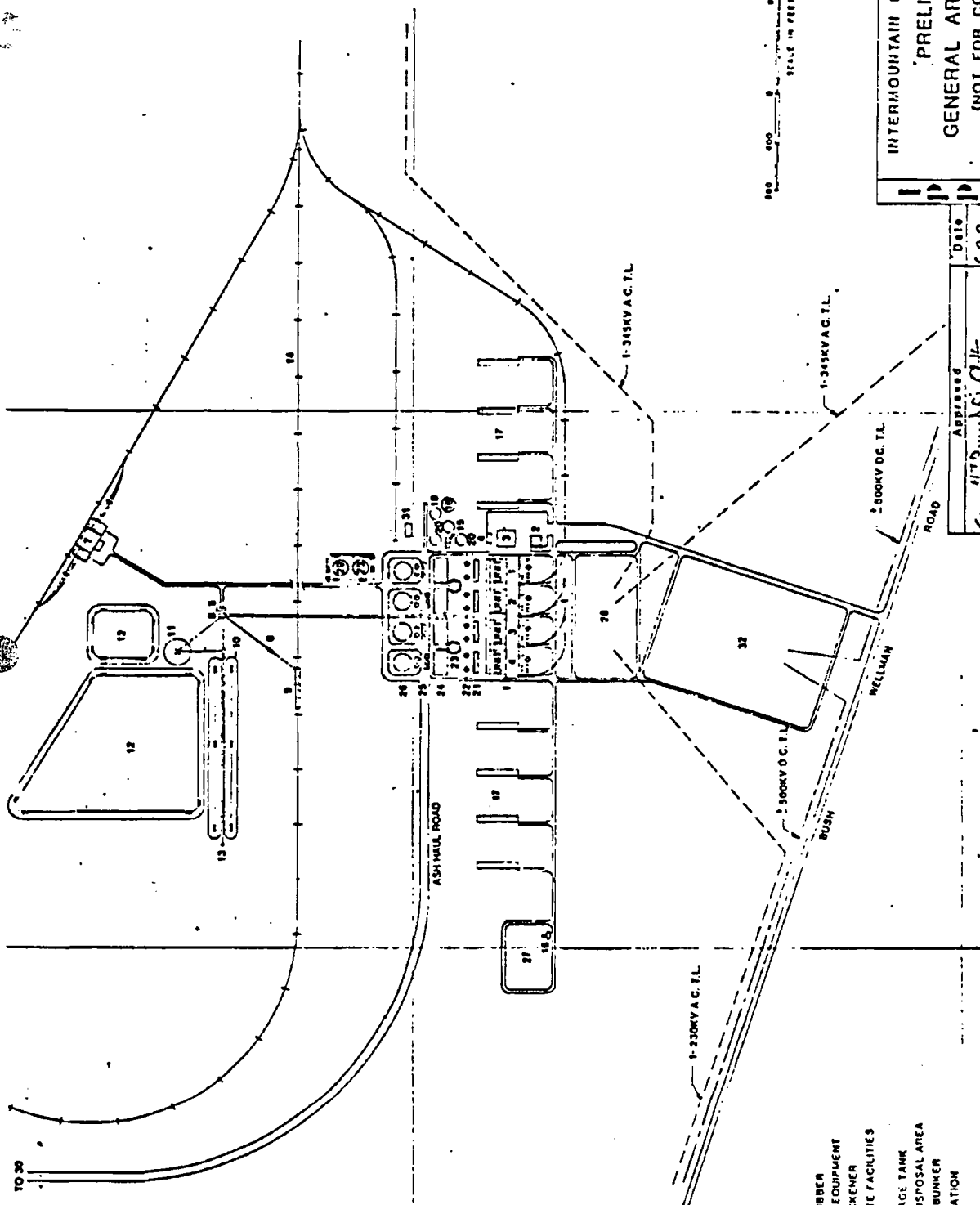




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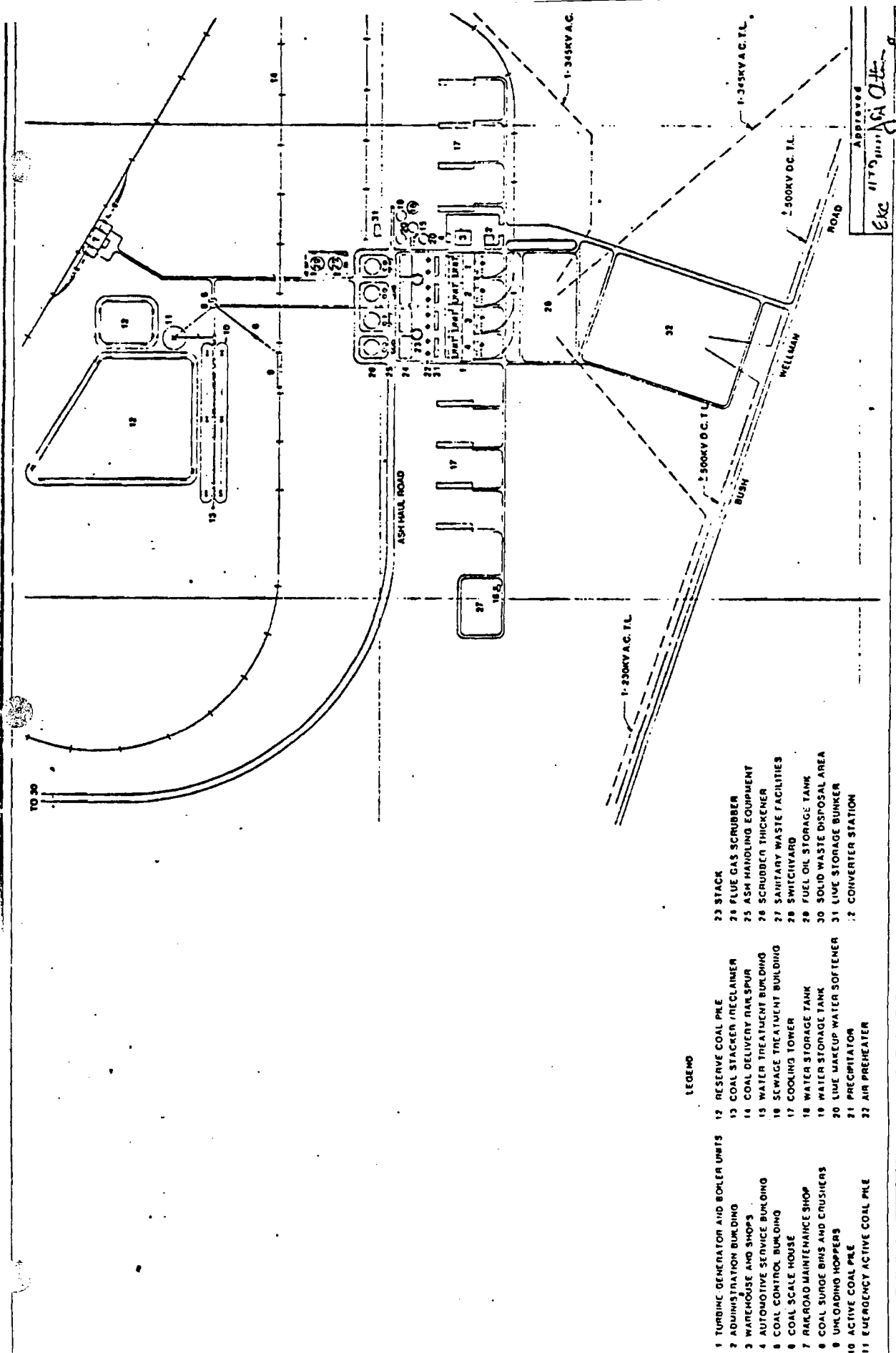
INTERMOUNTAIN POWER PROJECT
PRELIMINARY
GENERAL ARRANGEMENT
(NOT FOR CONSTRUCTION)
SL-MOR30

Approved: *[Signature]*
Date: 5-2-75
Exc: *[Signature]*



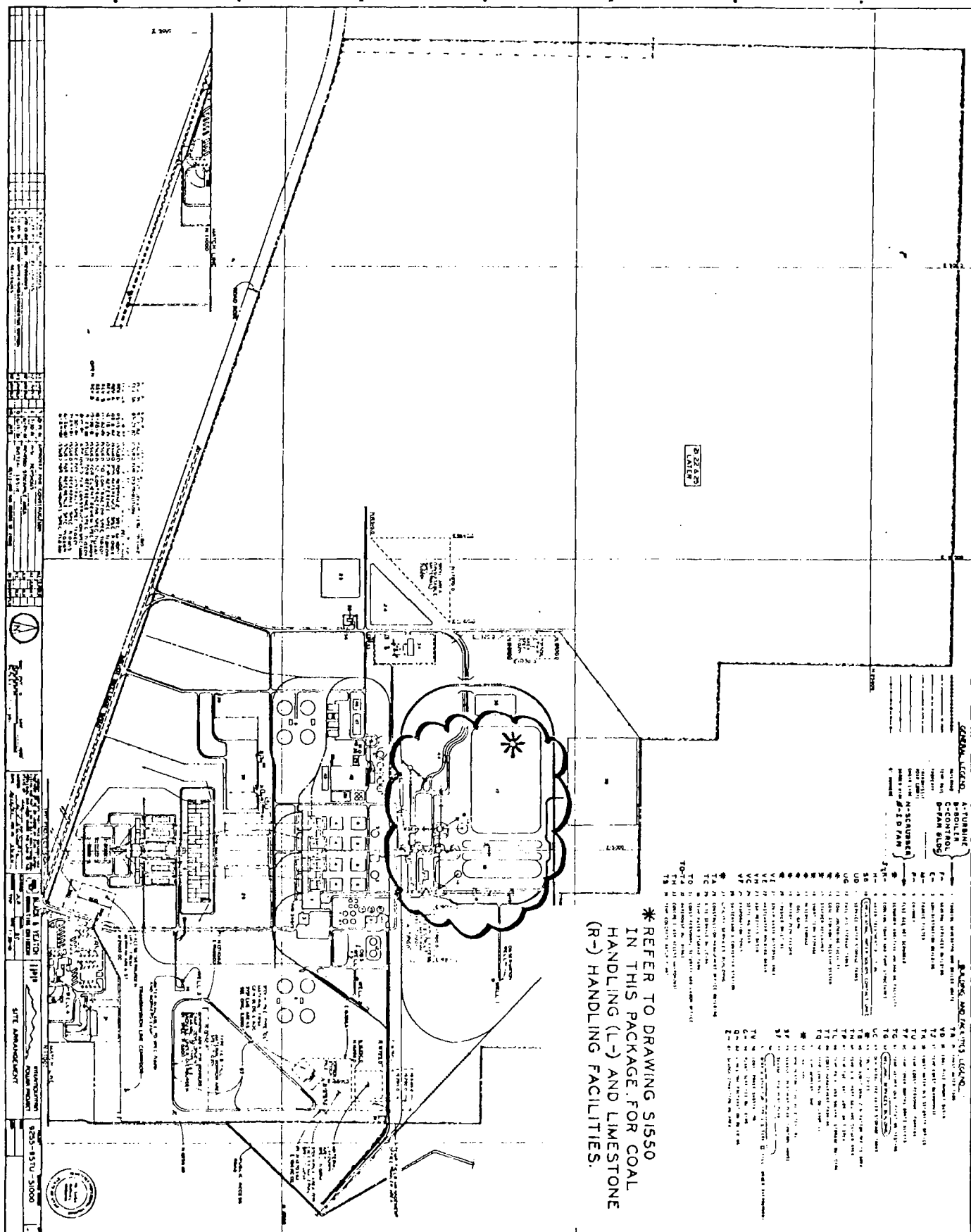
- 23 STACK
- 24 FLUE GAS SCRUBBER
- 25 ASH HANDLING EQUIPMENT
- 26 SCRUBBER THICKENER
- 27 SAVITARY WASTE FACILITIES
- 28 SWITCHYARD
- 29 FUEL OIL STORAGE TANK
- 30 SOLID WASTE DISPOSAL AREA
- 31 LIQUID STORAGE BUNKER
- 32 CONVERTER STATION

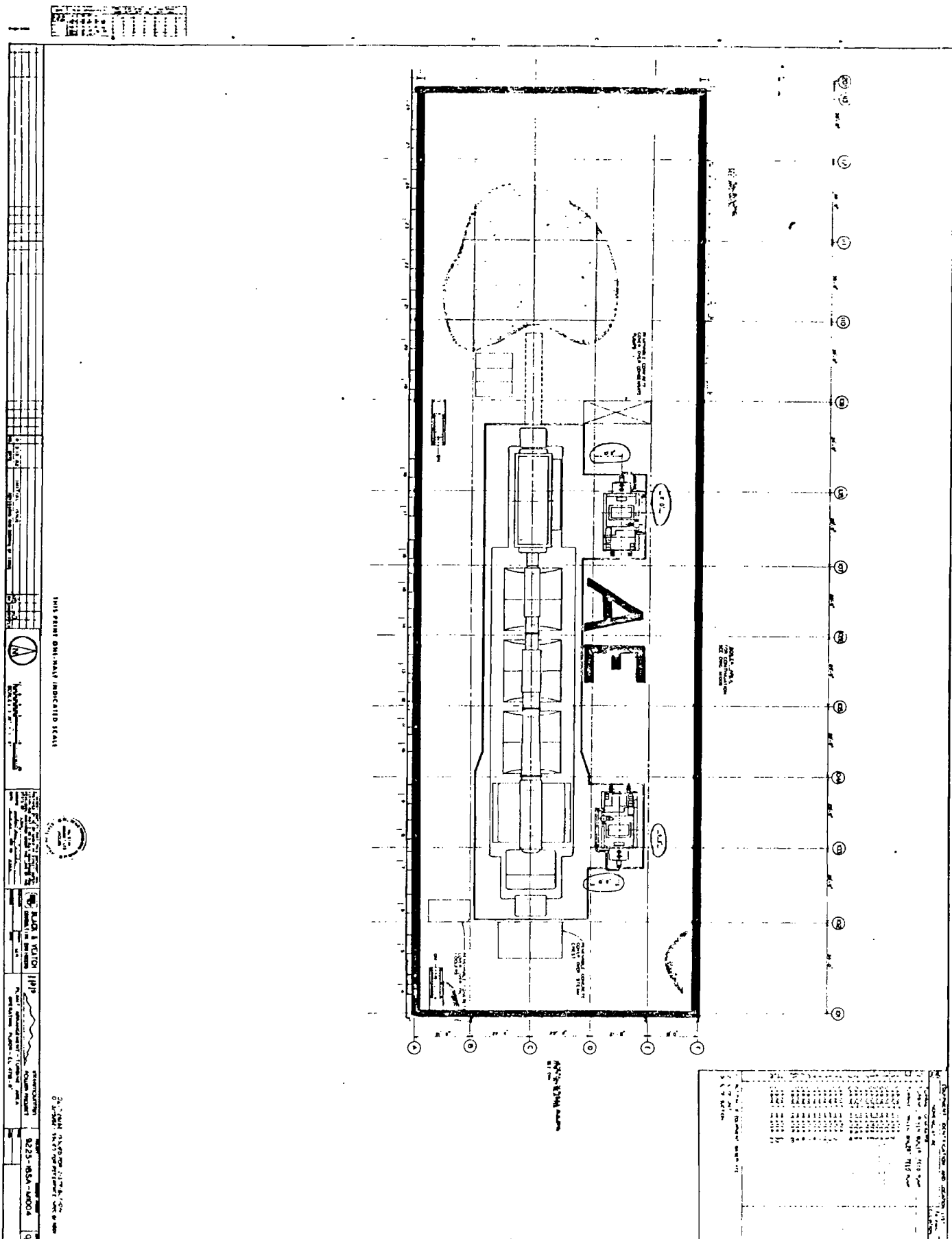
- 33 FUEL TANK
- 34 WATER TANK
- 35 WATER SOFTENER
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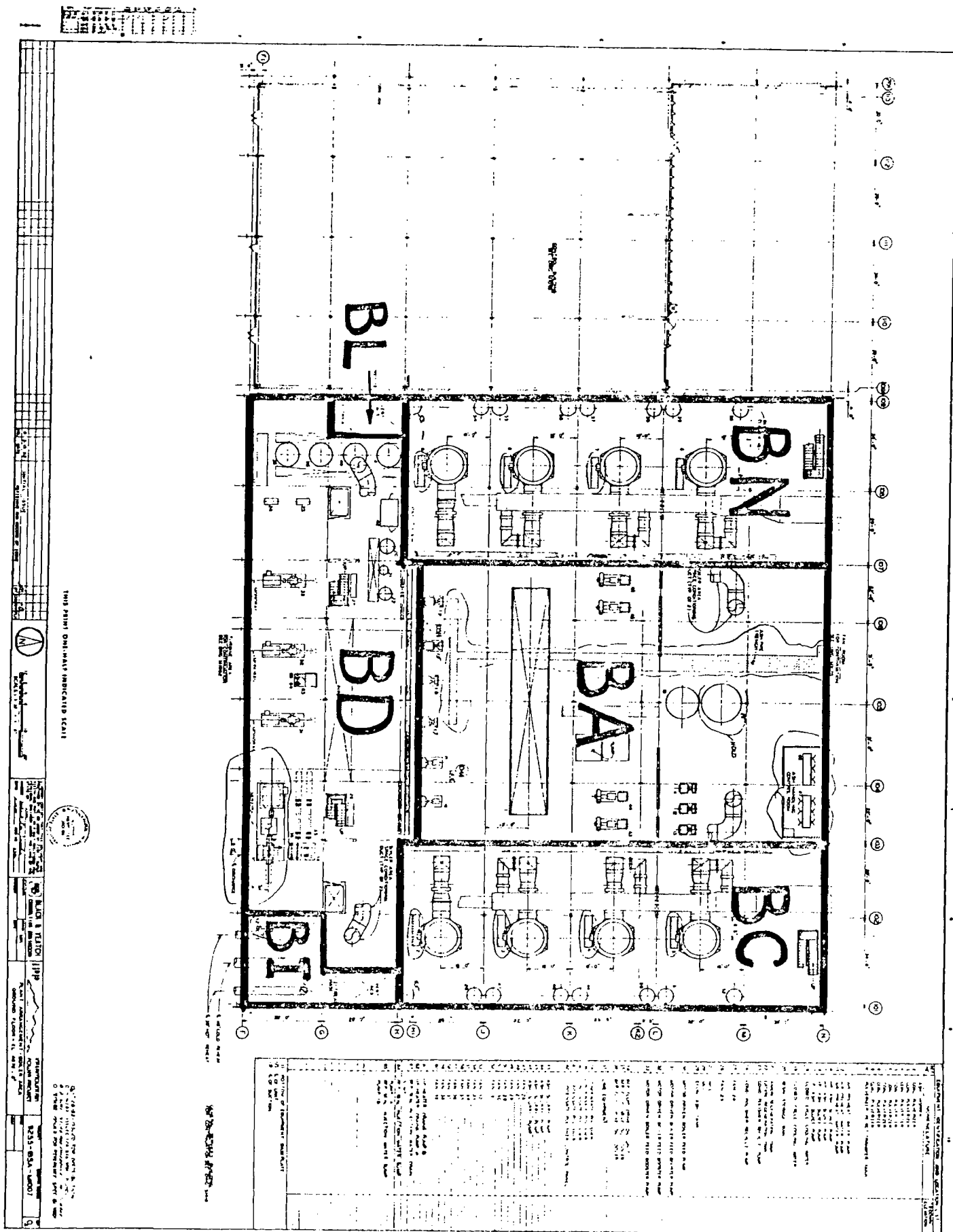
The following pages
in this section are
supplements —

Go Ben Brown
13 May 83

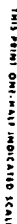




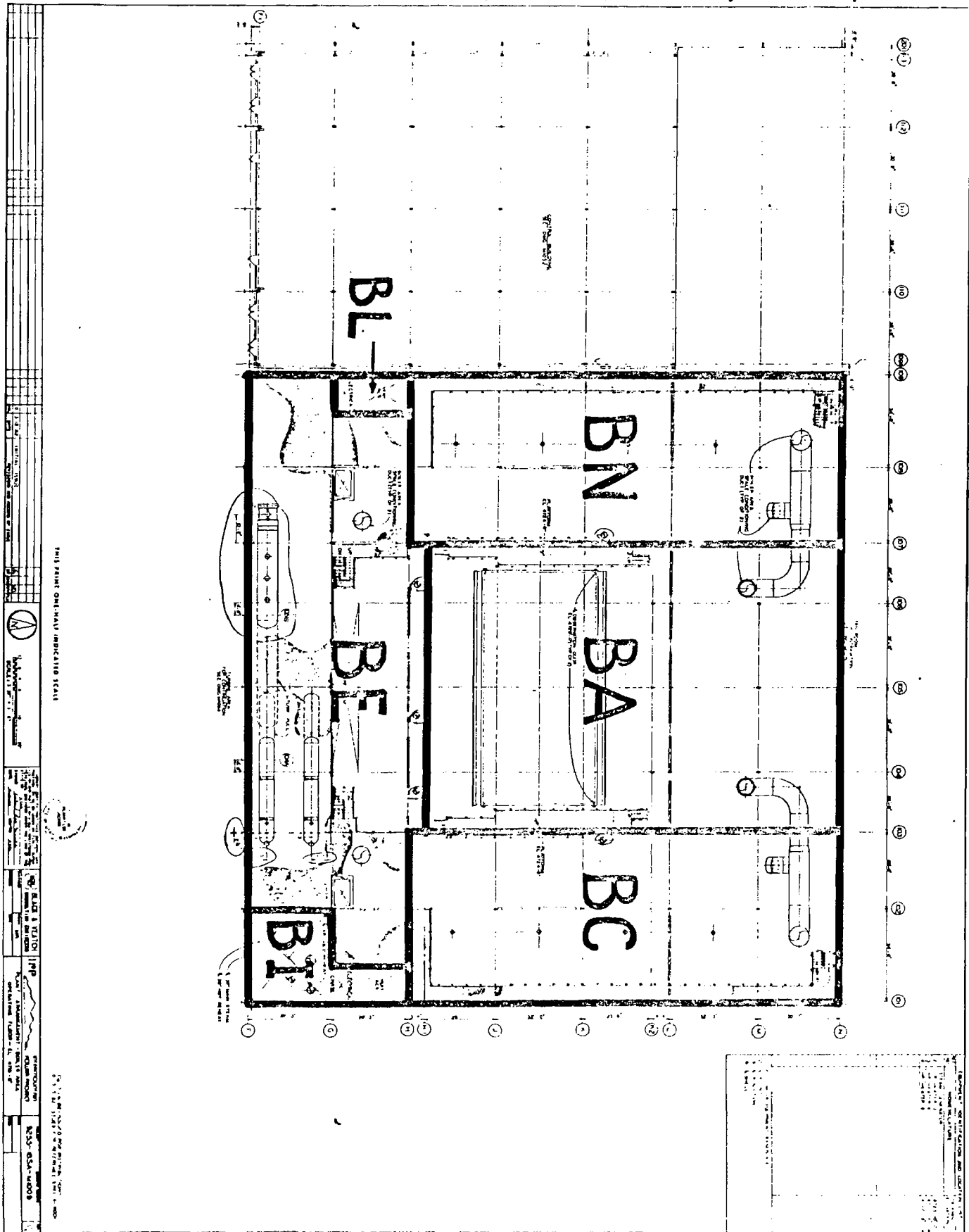
*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.



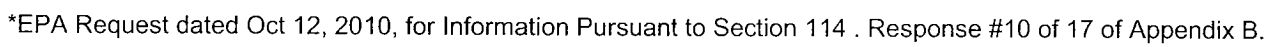
*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.

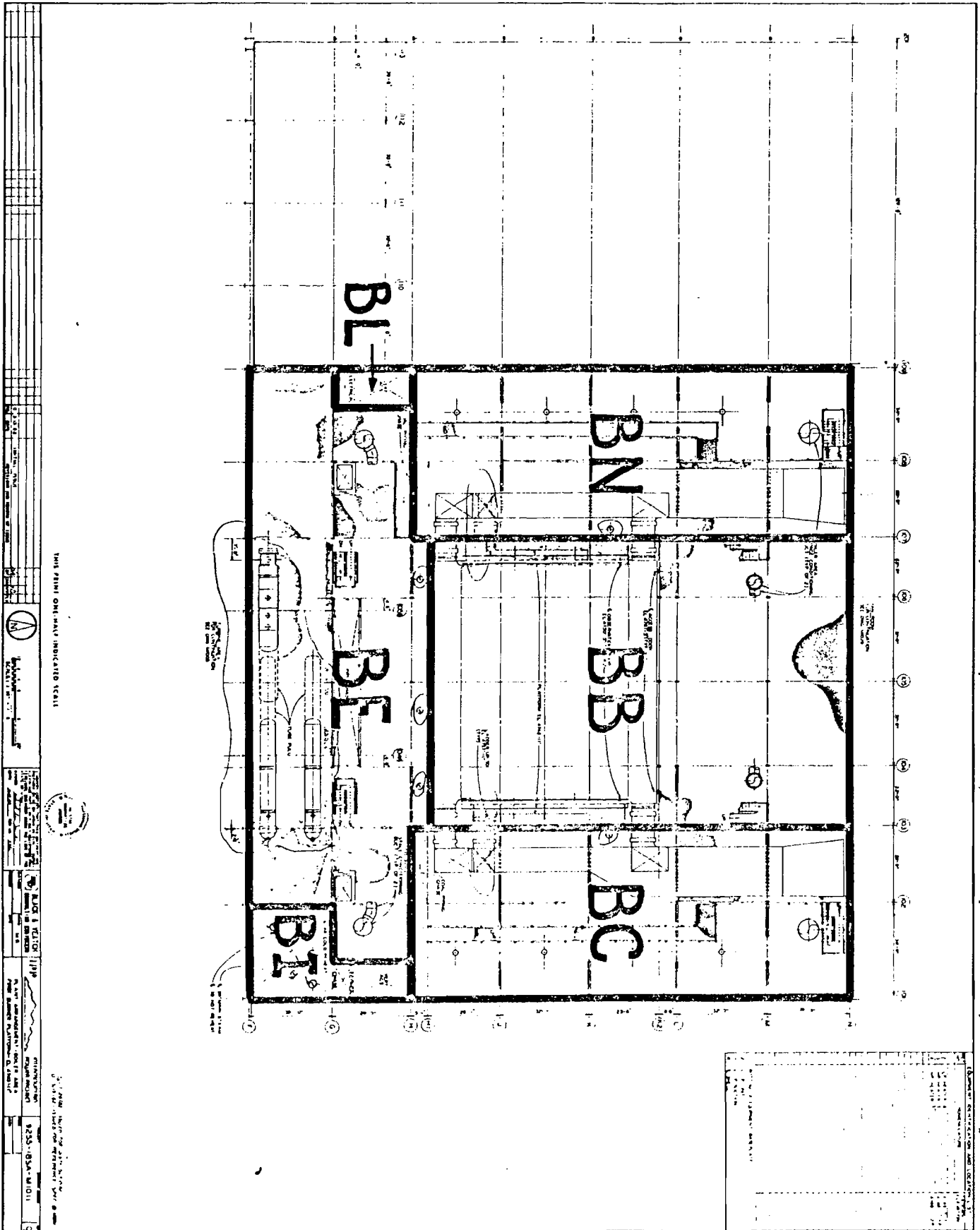


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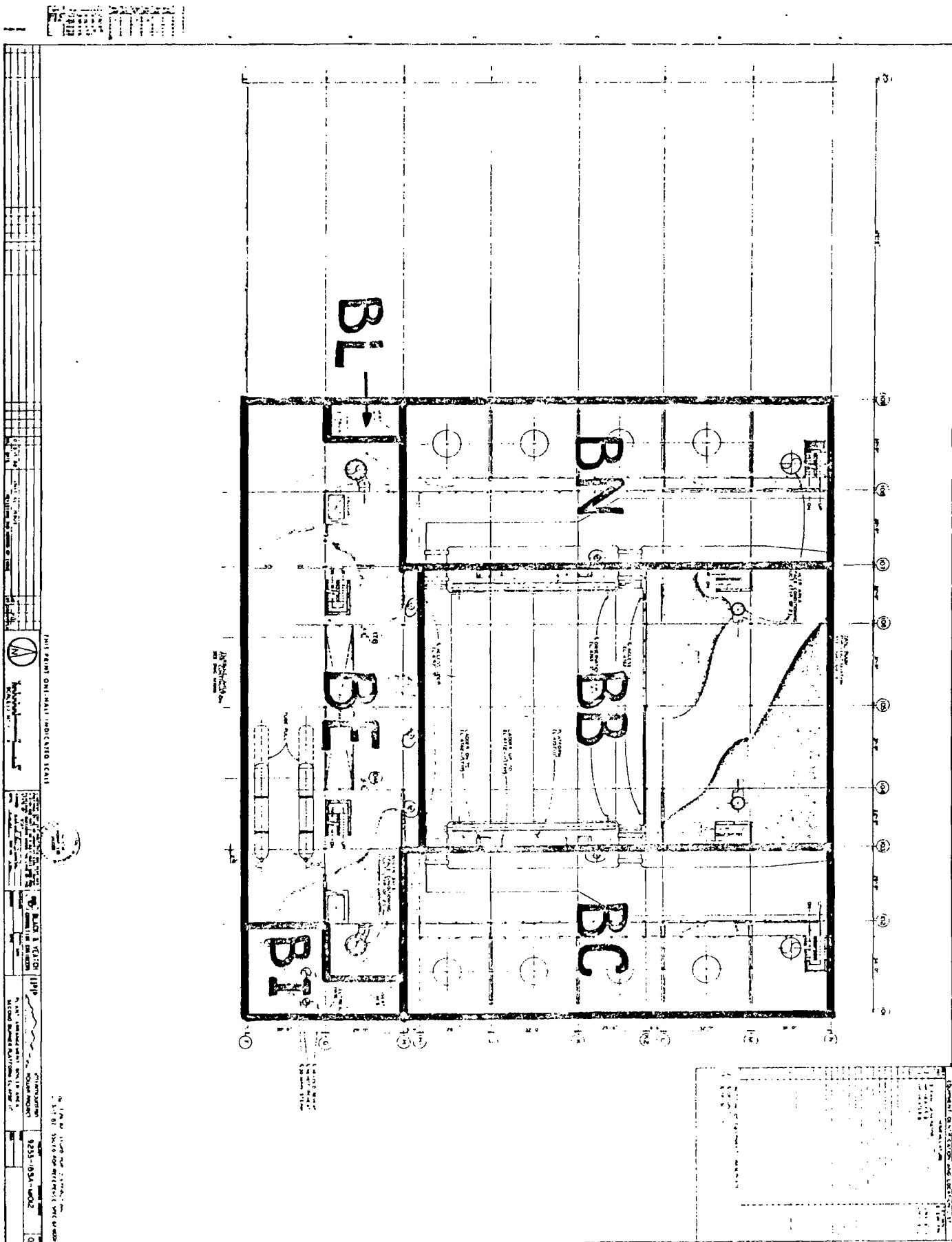


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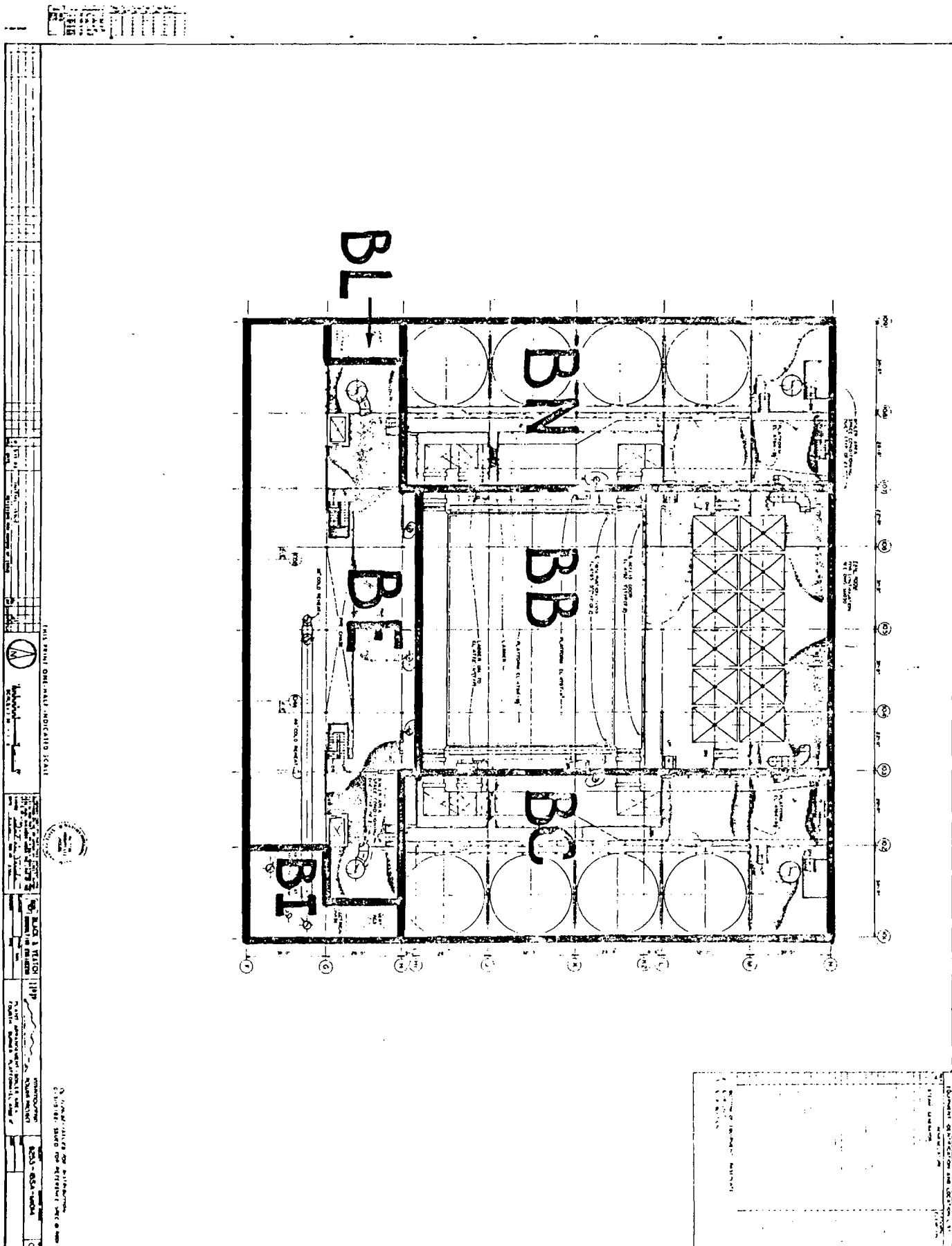




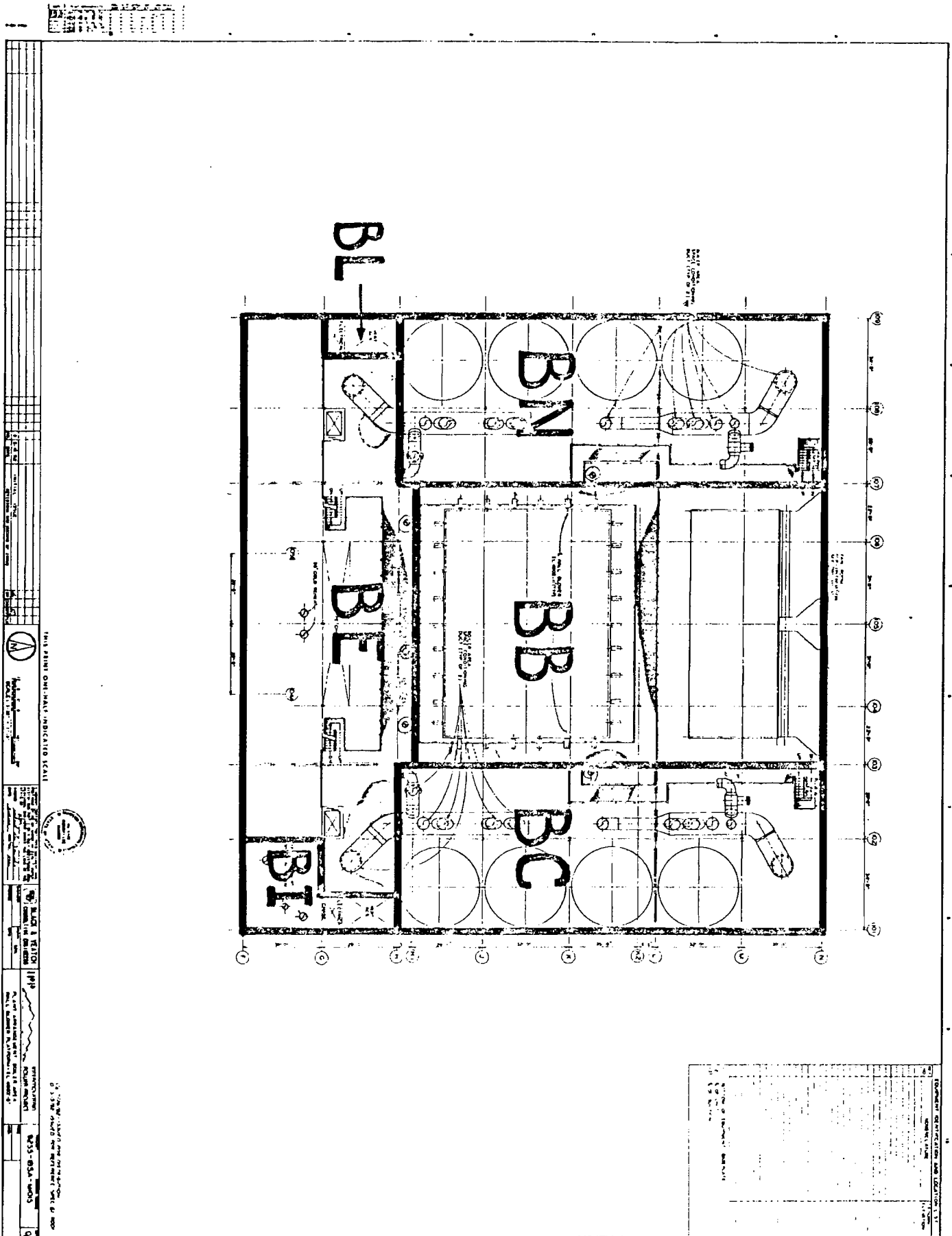
*EPA Request dated Oct 12, 2010, for Information Pursuant to Section 114 . Response #10 of 17 of Appendix B.



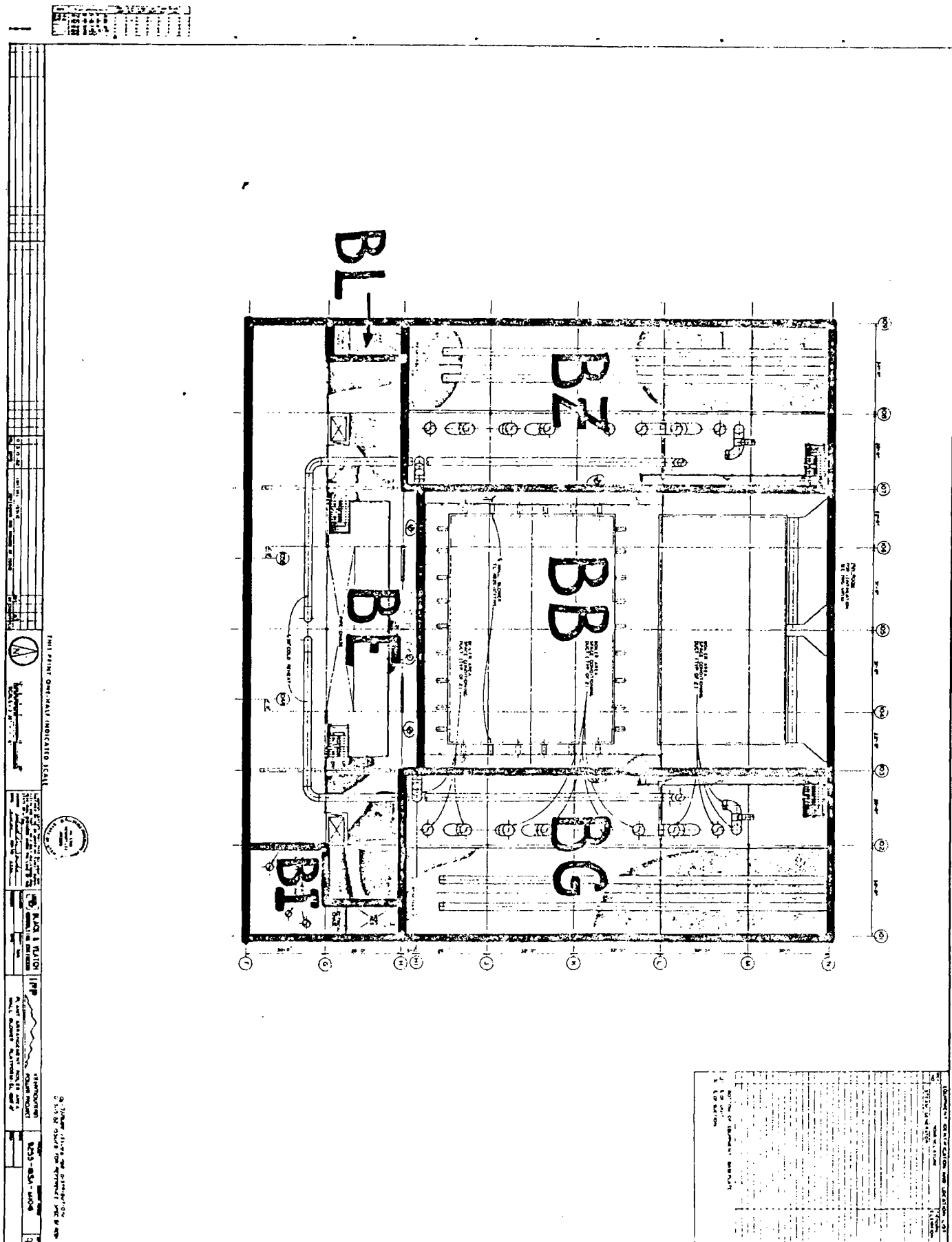
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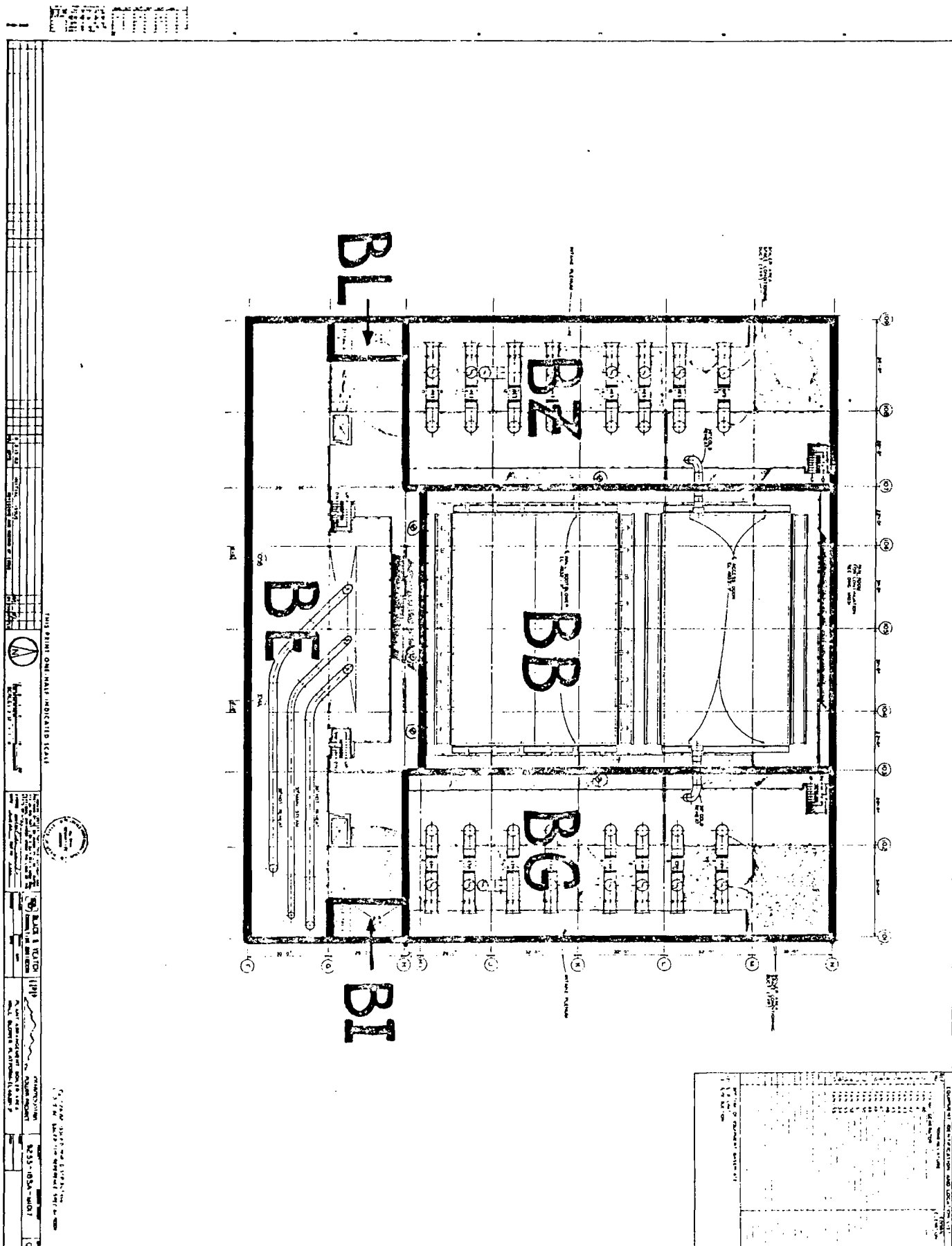


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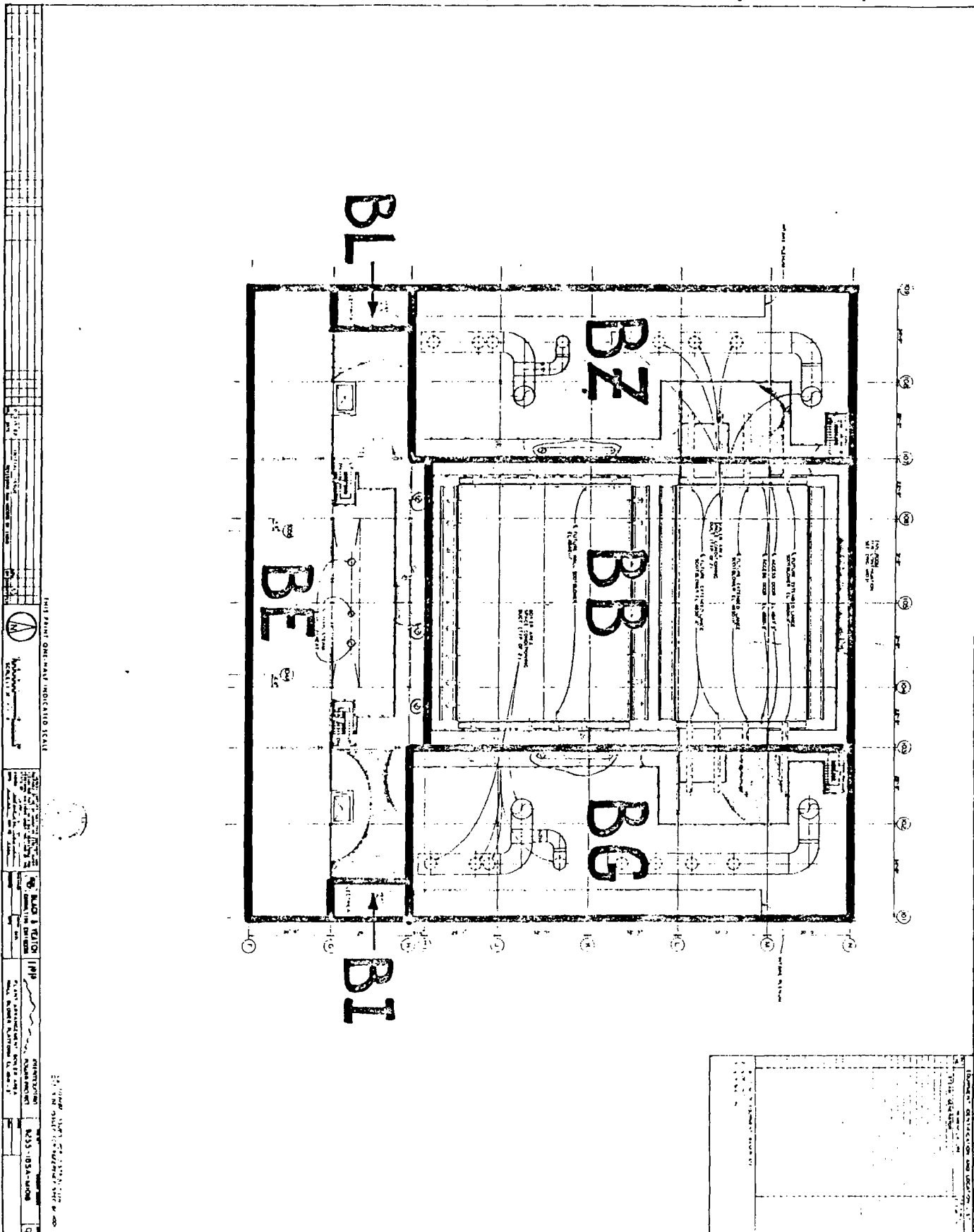


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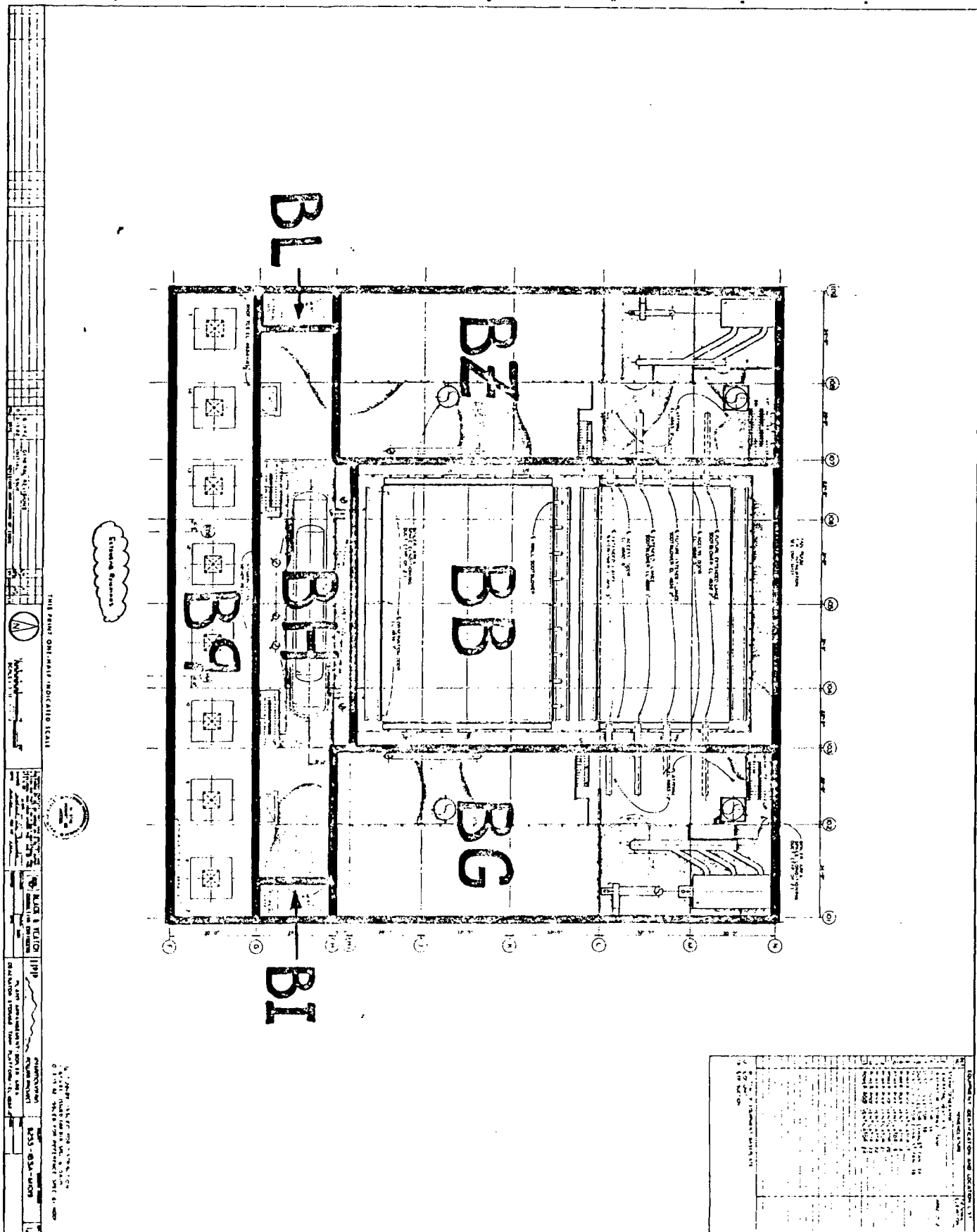


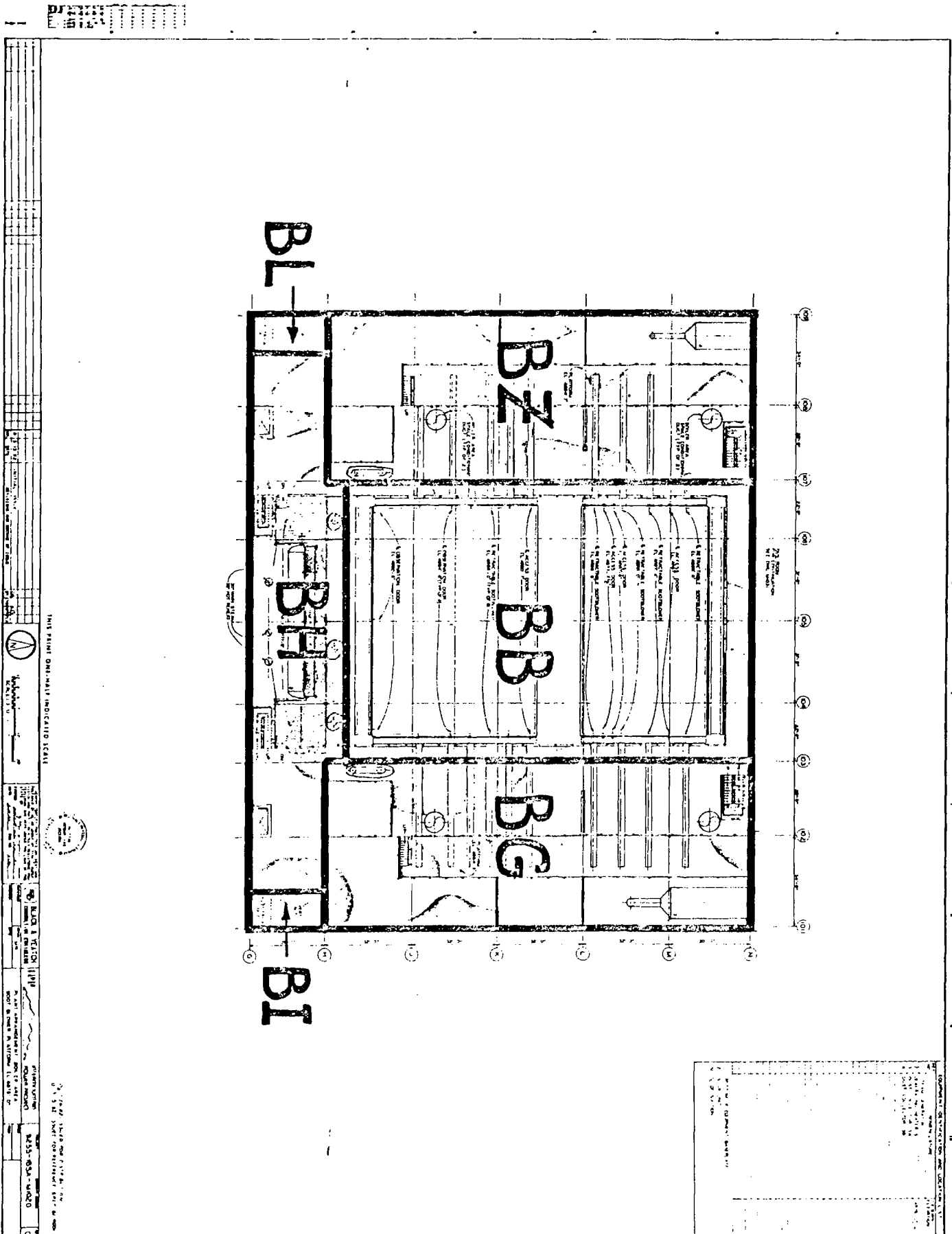


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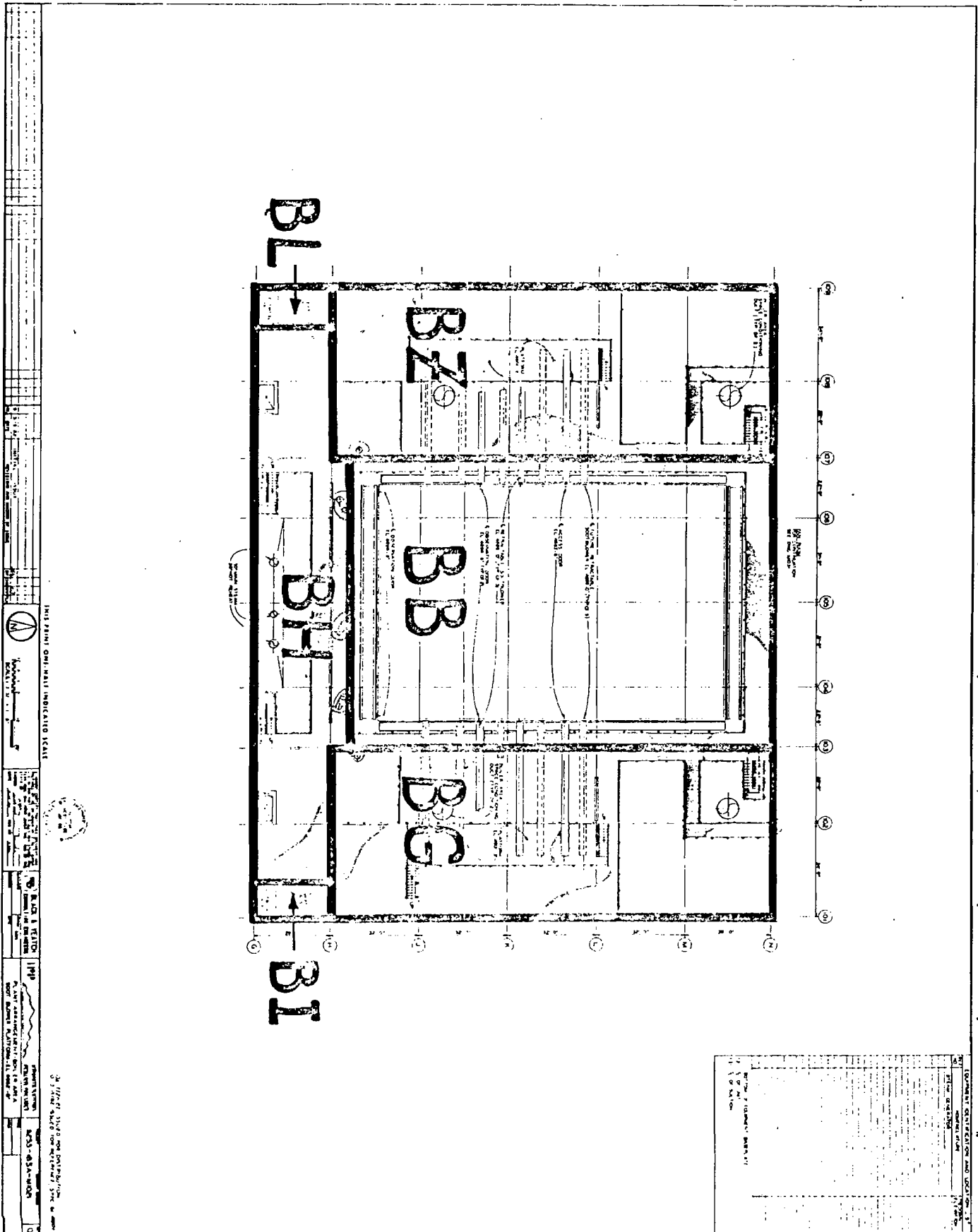


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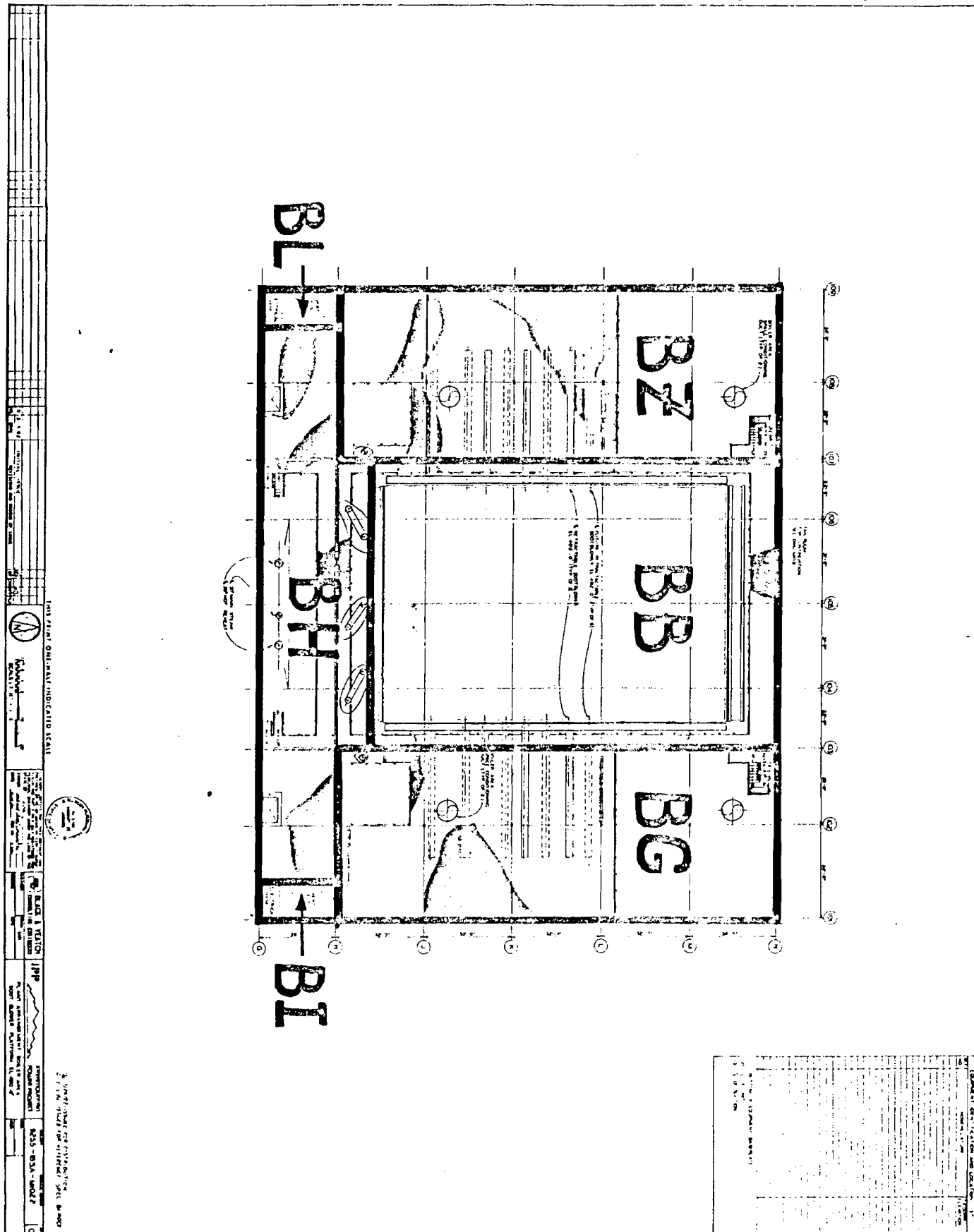




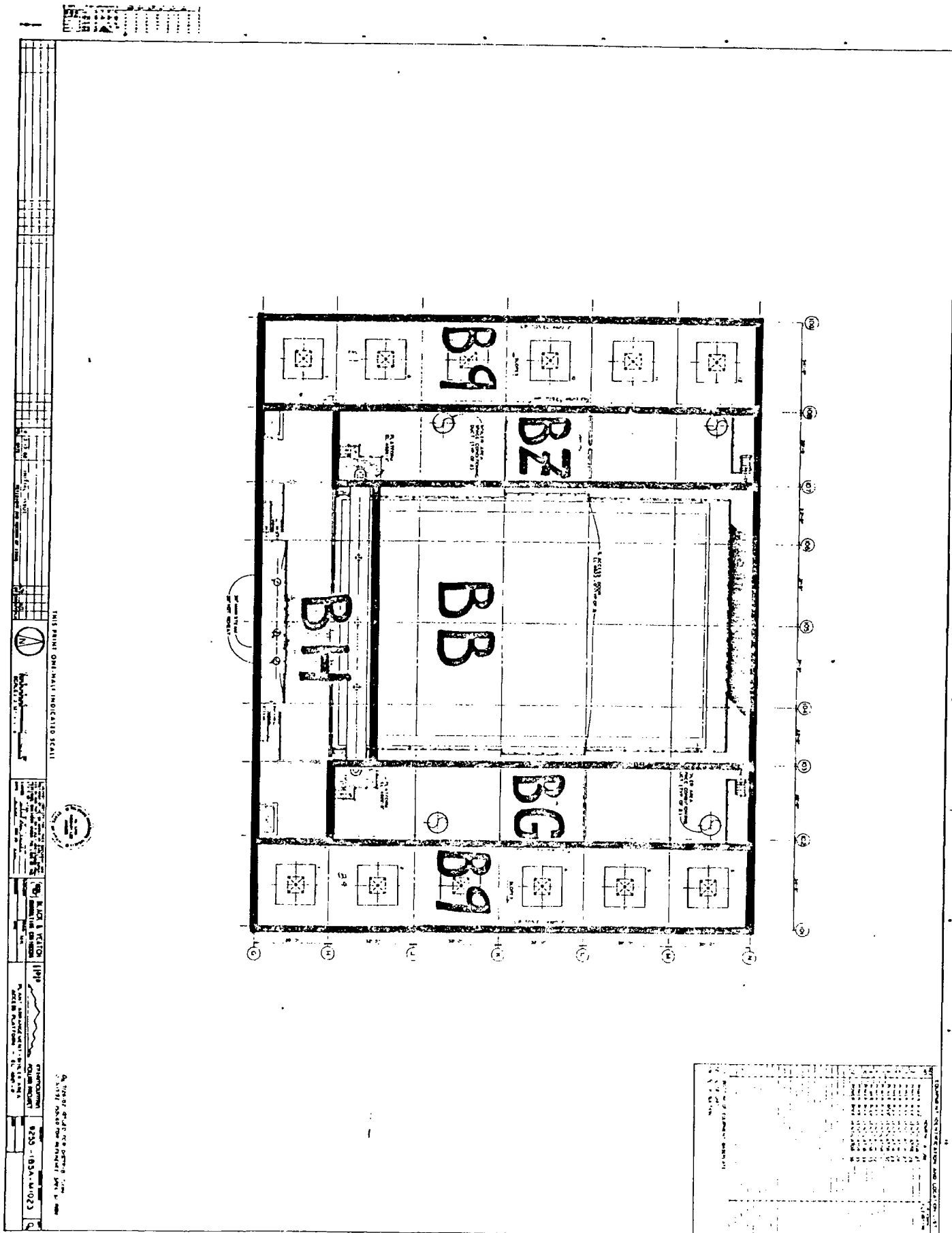
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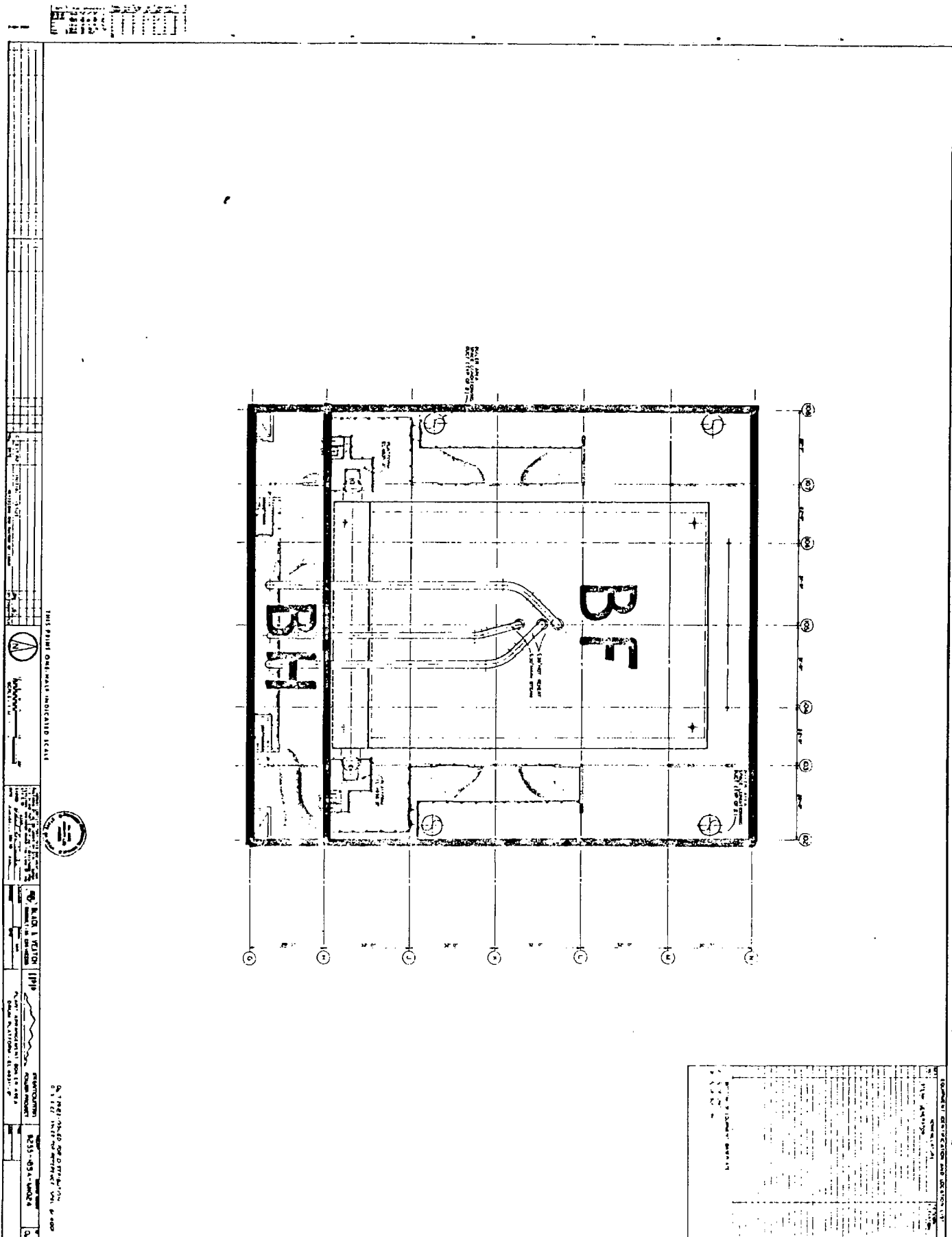
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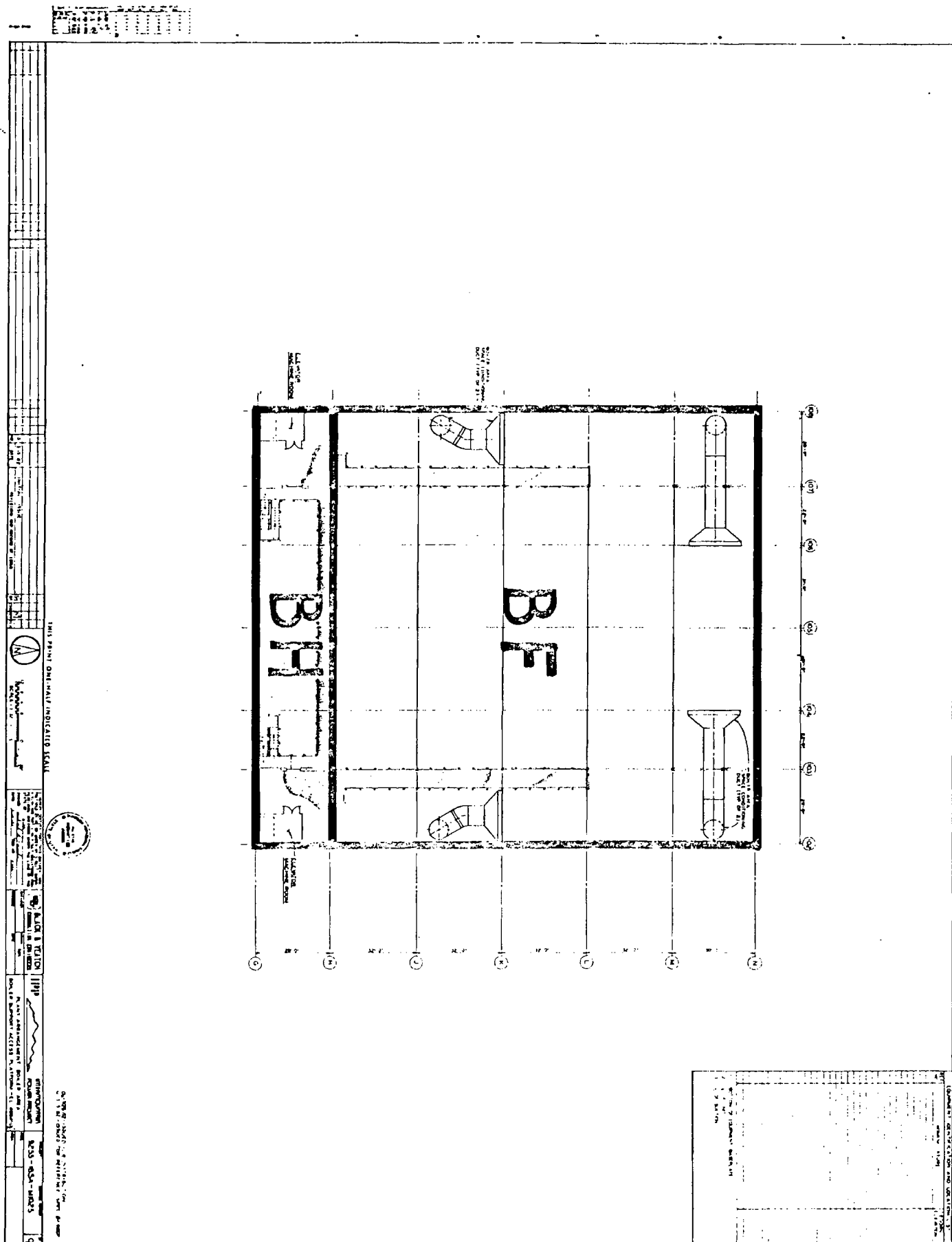
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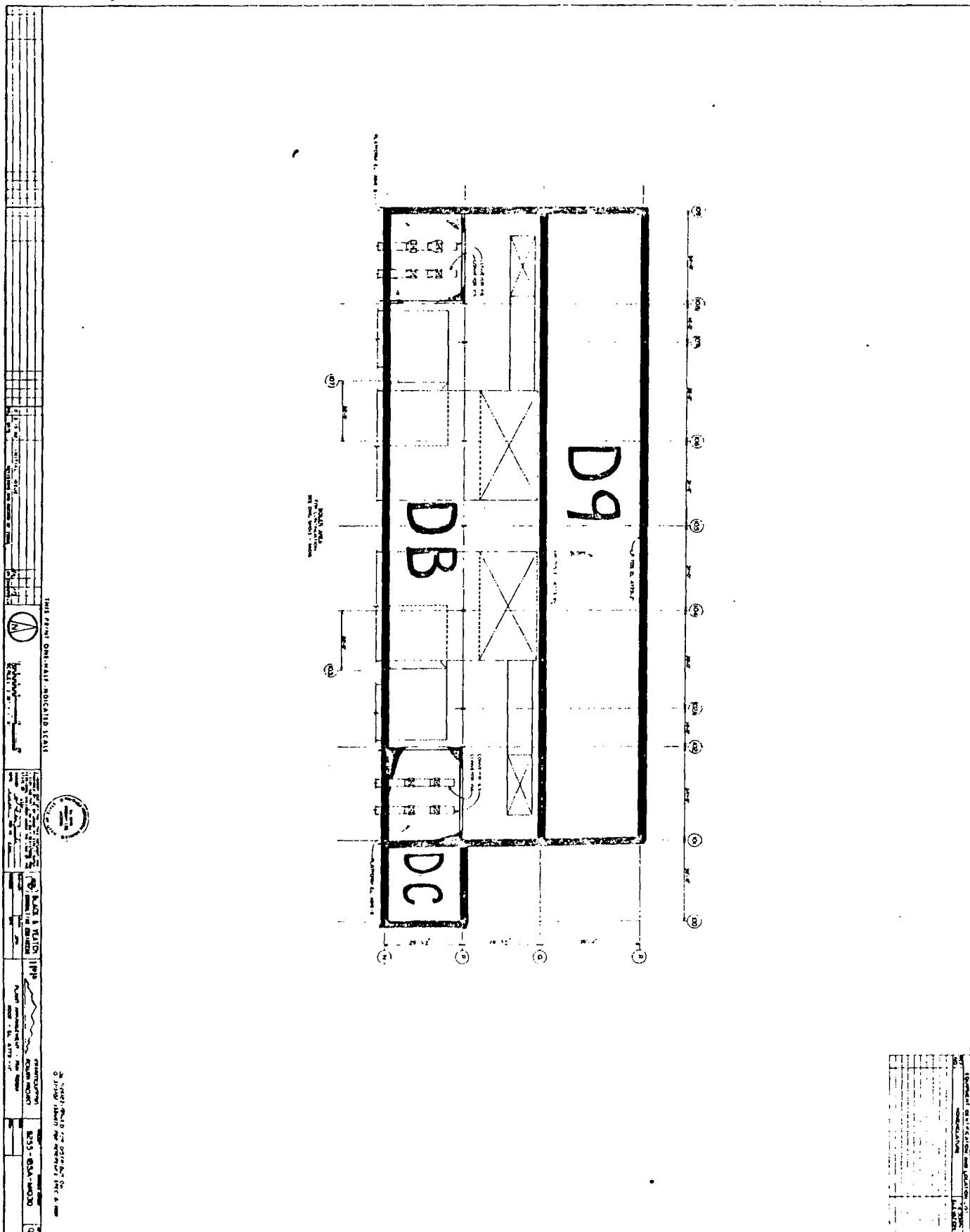
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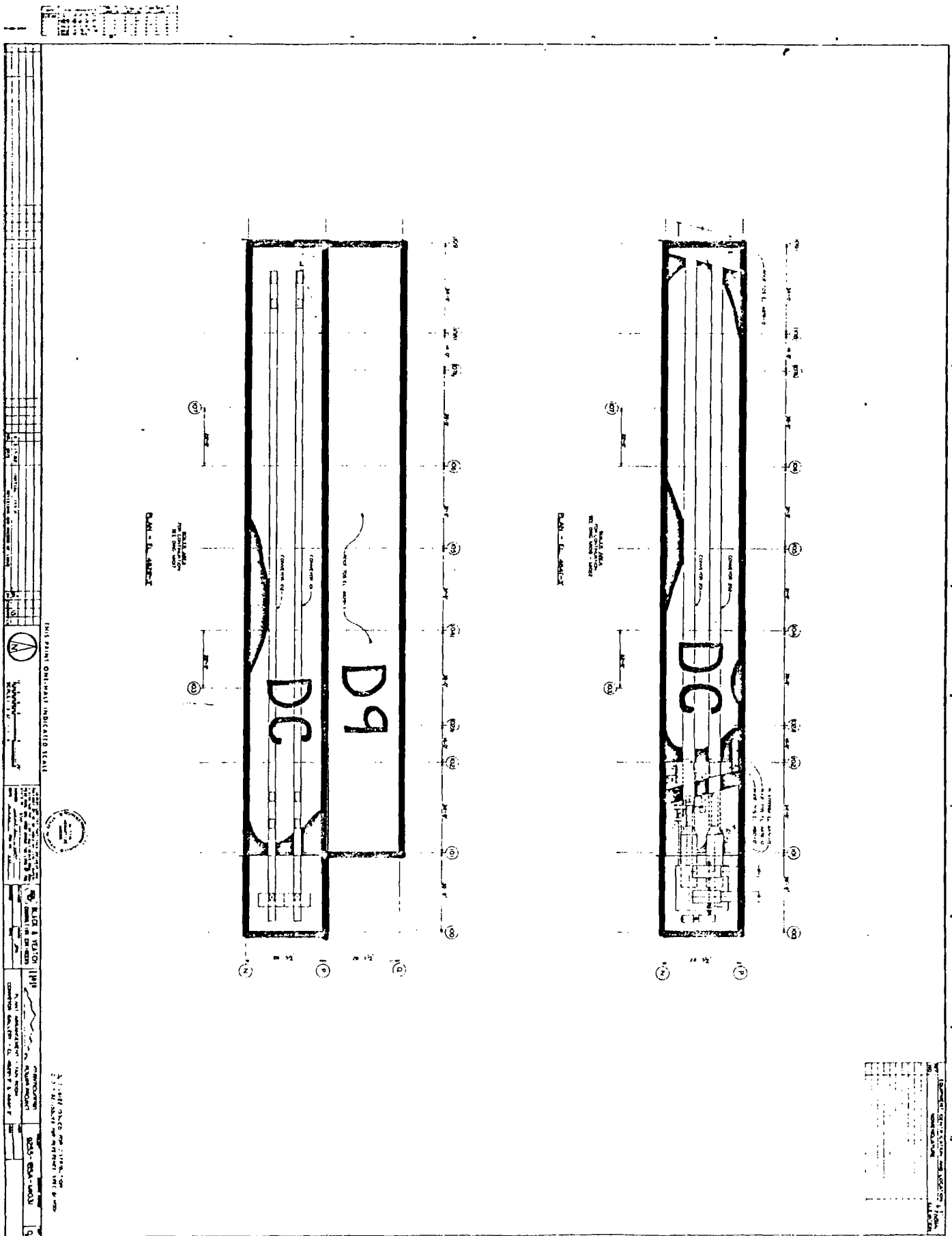
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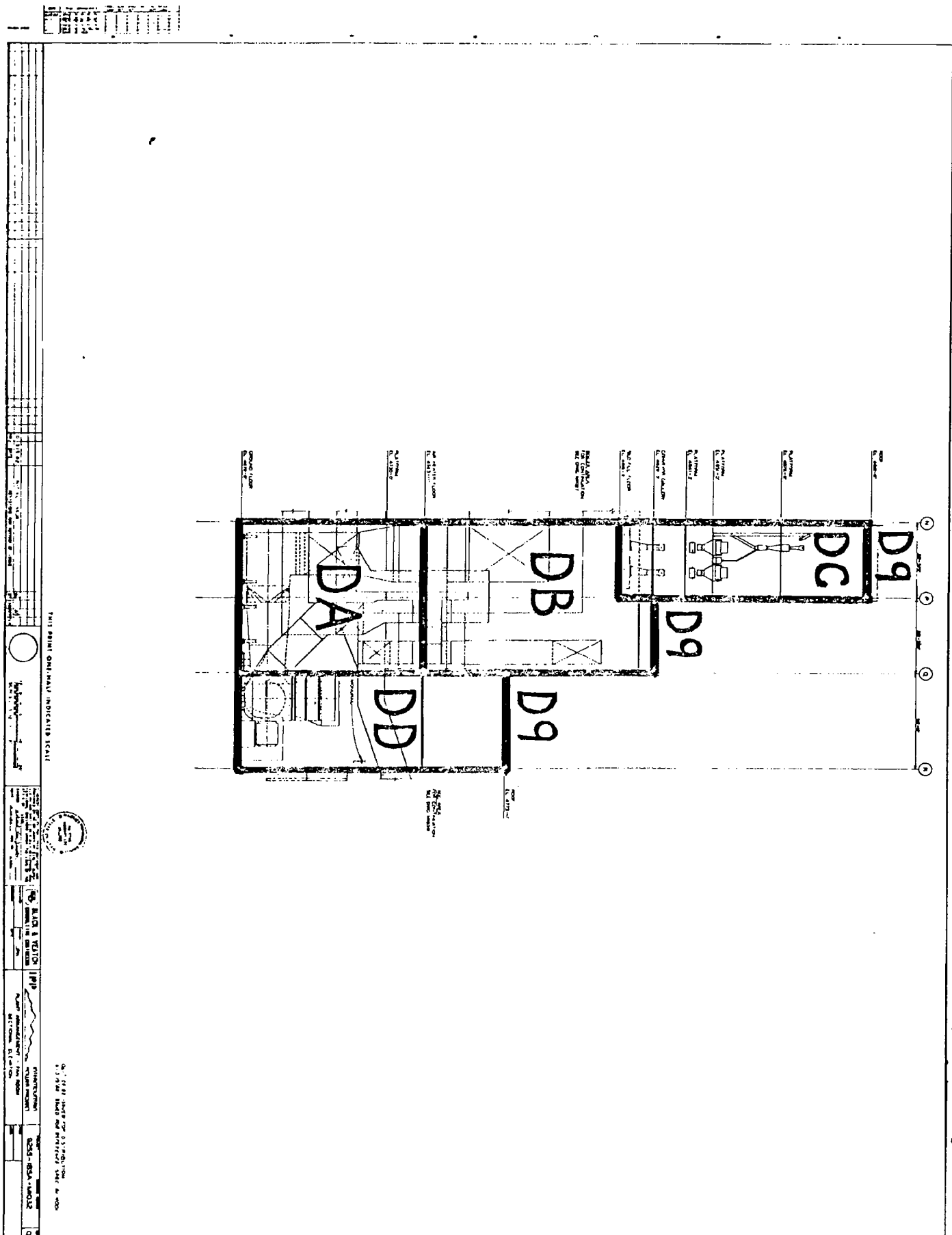


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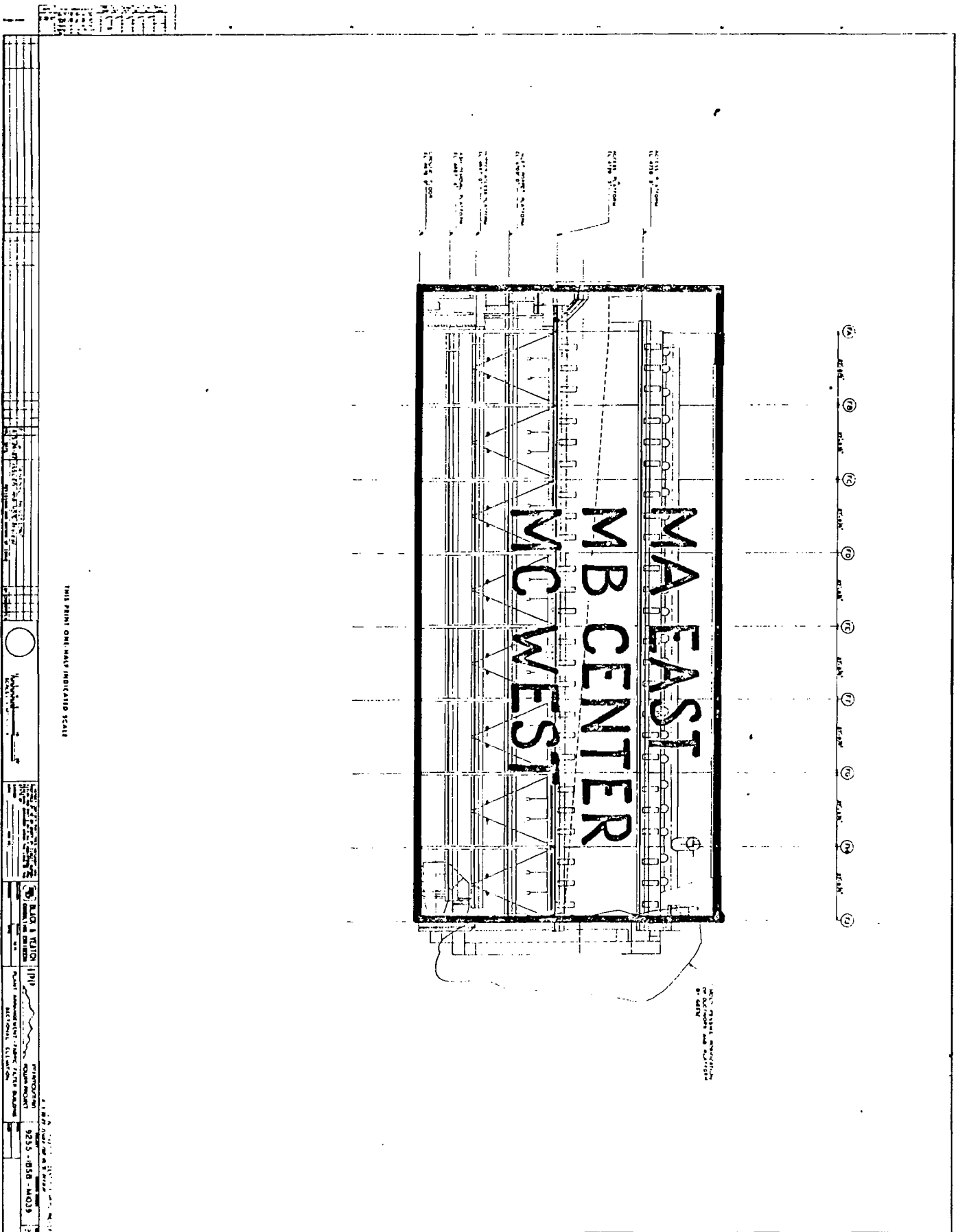


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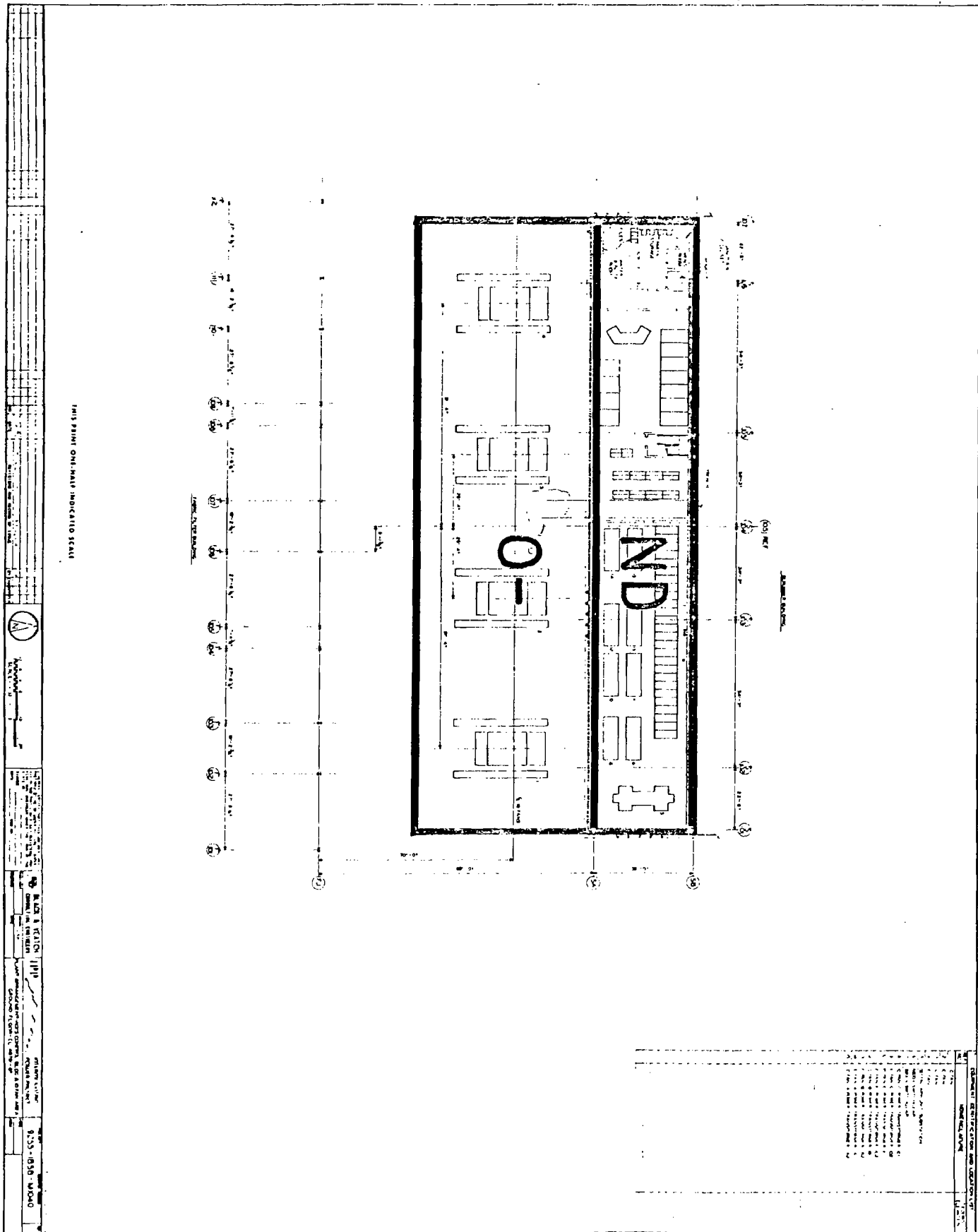




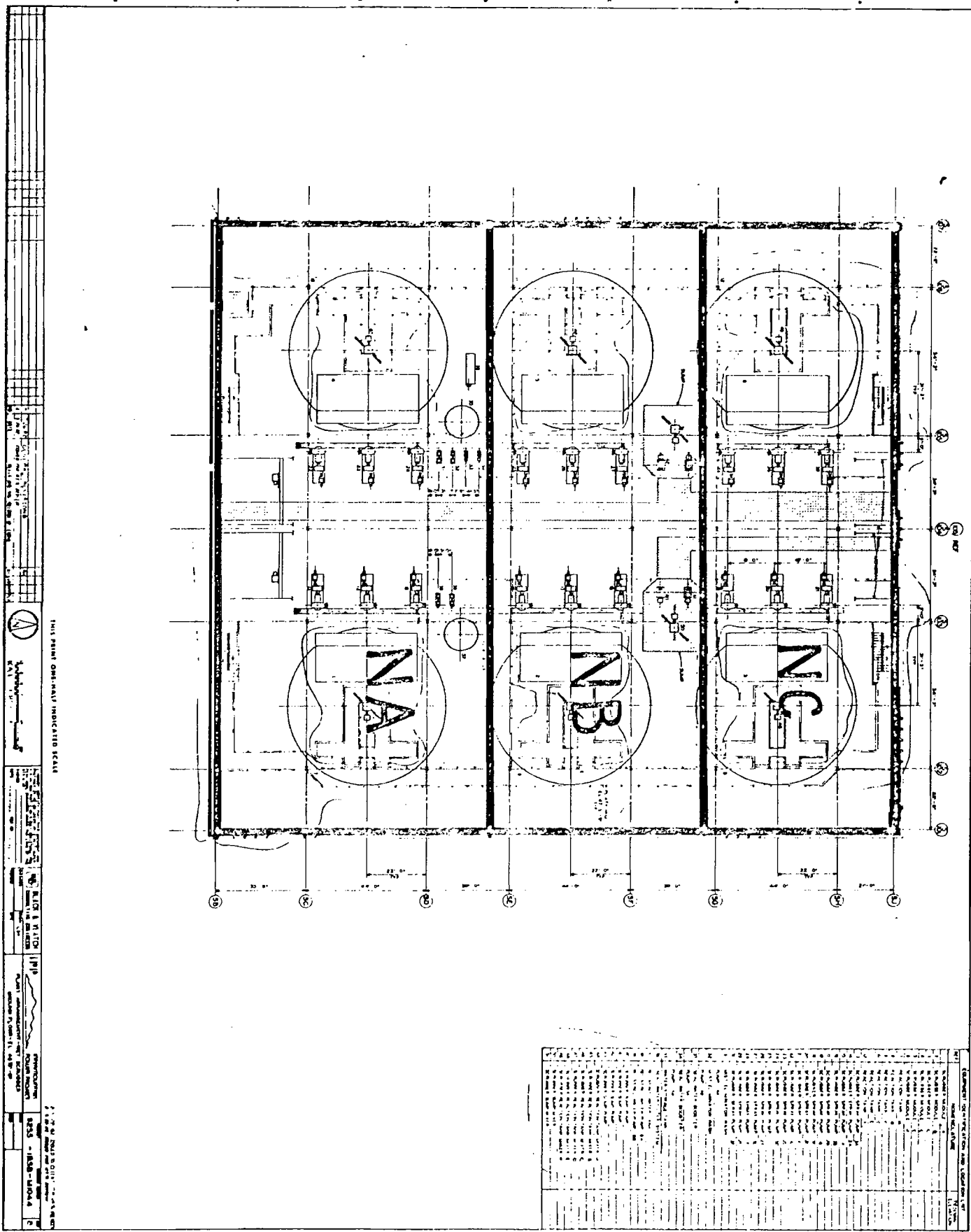
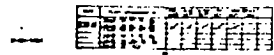
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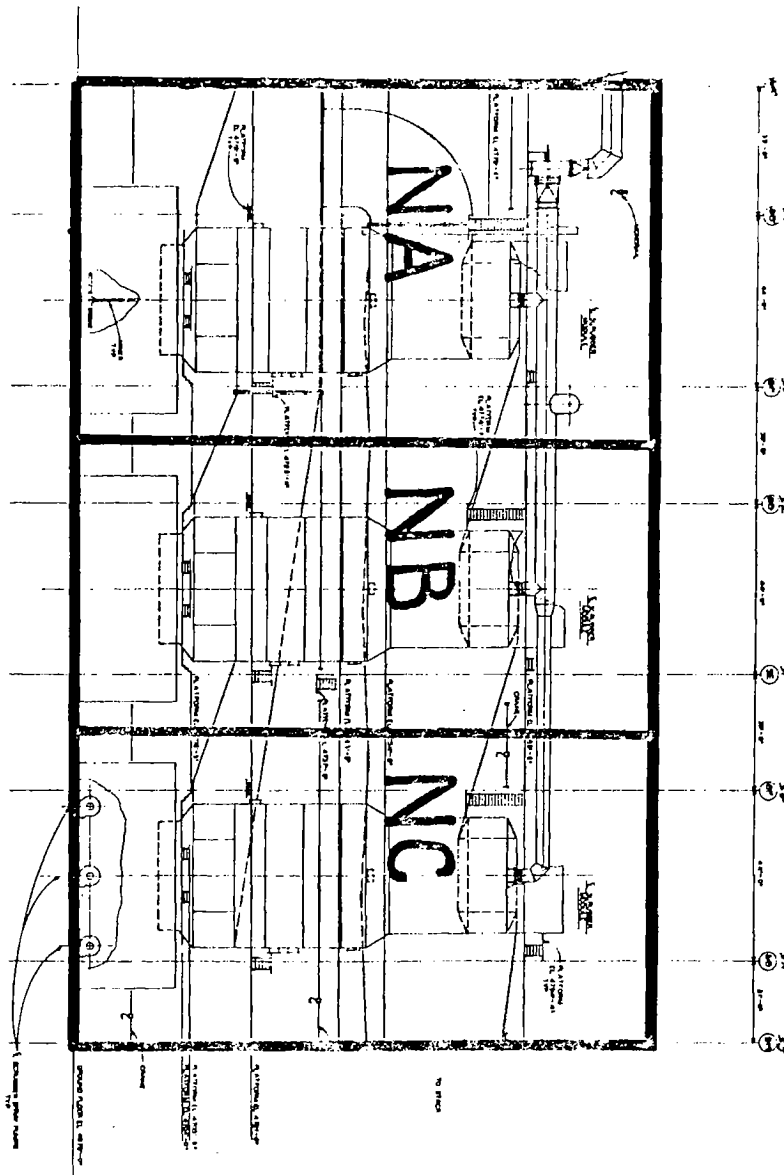


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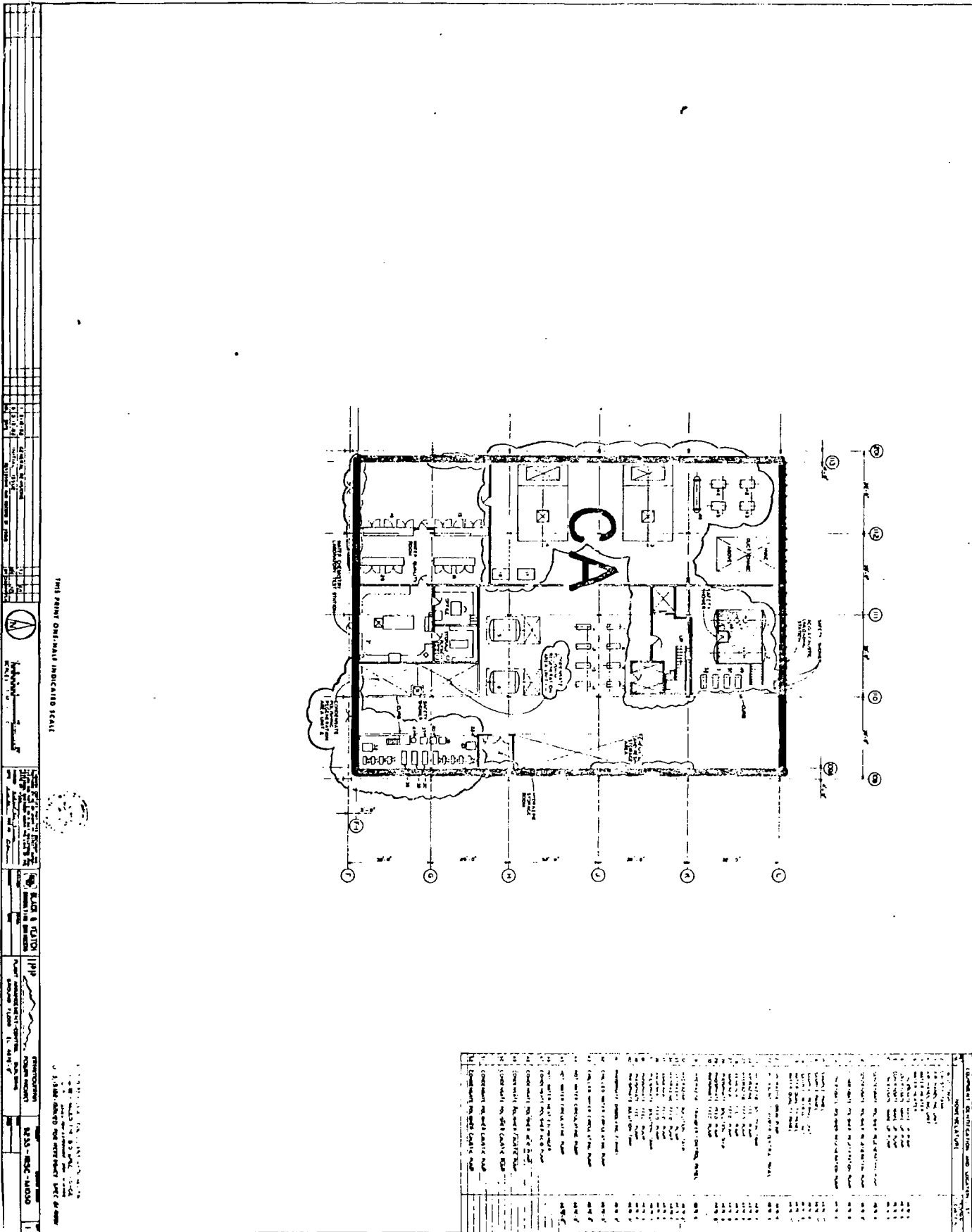


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THIS PRINT ORIGINALLY INDICATES SCALE	
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